

A CHILTON

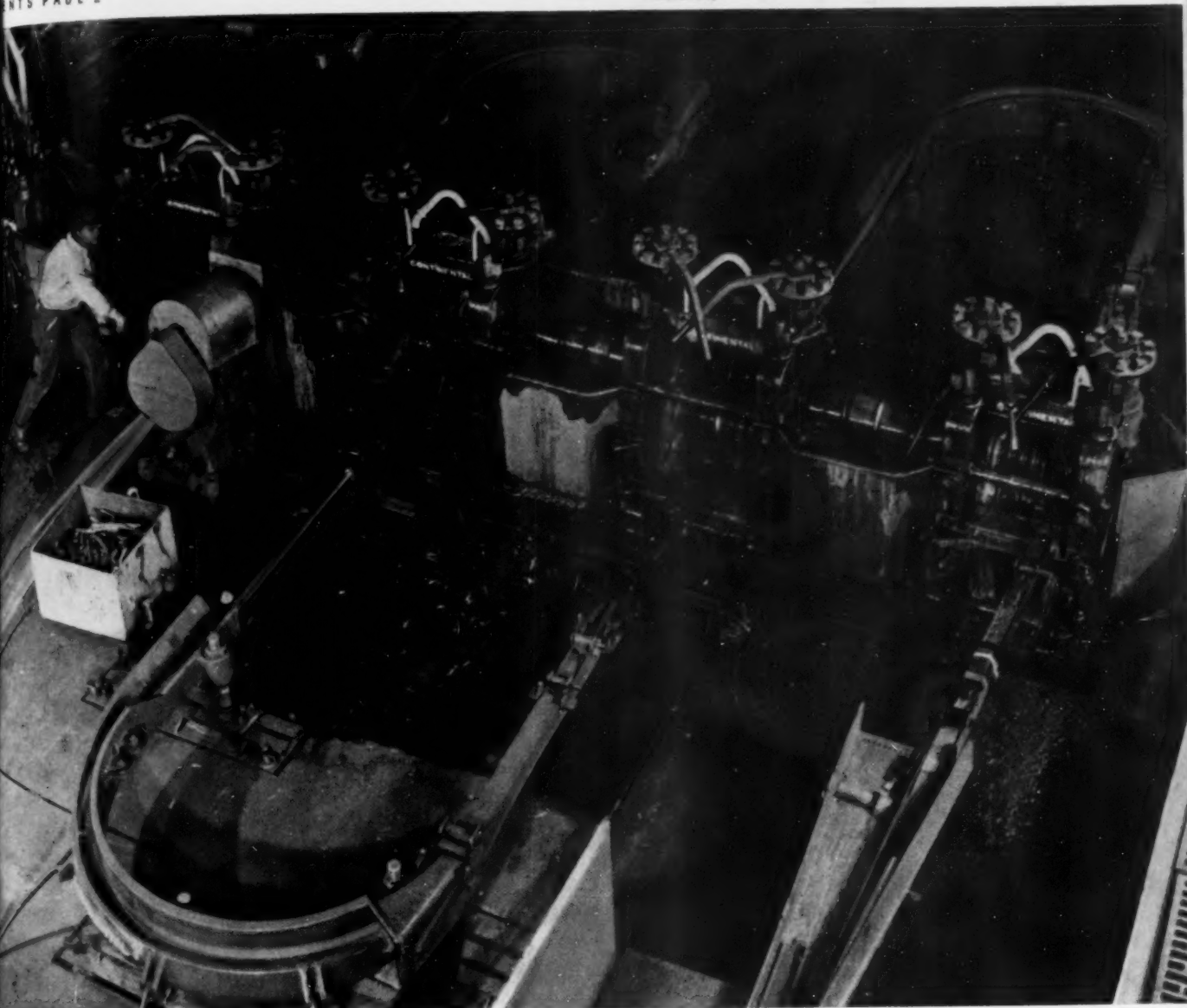
PUBLICATION

# The Iron Age

NOV 20 1953  
NATIONAL METALWORKING WEEKLY  
EAST-ENGINEERING  
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November 19, 1953

ENTS PAGE 2



10-INCH MERCHANT MILL

## Complete Rolling Mill Installations

★  
SLABBING MILLS  
UNIVERSAL MILLS  
PLATE MILLS  
HOT STRIP MILLS  
COLD STRIP MILLS  
TEMPER MILLS

Mills complete with  
Auxiliary Equipment

★ ★ ★

CONTINENTAL CHIPPER  
ROLL LATHES  
SPECIAL MACHINERY

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BLOOMING MILLS  
STRUCTURAL MILLS

RAIL MILLS  
BILLET MILLS  
ROD MILLS  
MERCHANT MILLS

Plants at  
East Chicago, Ind. • Wheeling, W. Va. • Pittsburgh, Pa.

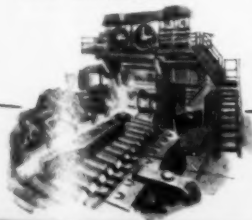
CHICAGO • PITTSBURGH

CASTINGS—carbon and alloy steel  
from 20 to 250,000 pounds

ROLLS—iron, alloy iron and steel  
rolls for all types of rolling mills

WELDMENTS—fabricated steel  
plate, or cast-weld design.

**CONTINENTAL**  
Foundry & Machine  
Company



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## *"Quick Change Artist"* **moves cars like magic !**



The Trackmobile goes right to the job on its road wheels—changes to track wheels in 30 seconds. It's now ready to switch, spot or haul.

For hundreds of plants the sensational Whiting Trackmobile has revolutionized freight car handling. Traffic men claim it is far more efficient than the ordinary switch engine because it travels on track or road and can't be "bottled up." It handles a variety of jobs on different tracks in a matter of minutes. The Trackmobile is low in original cost, low in operating cost. It speeds up freight car movement—reduces demurrage—increases production!

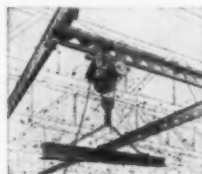
Write today for "Reports From The Field"—a booklet containing practical information for simplifying freight car handling.

### **WHITING CORPORATION**

15601 Lathrop Avenue, Harvey, Illinois

*Sales Offices and Distributors throughout the world.*

Other Whiting products that speed handling and reduce cost



Trambeam Overhead Handling Systems



Electric Chain Hoists



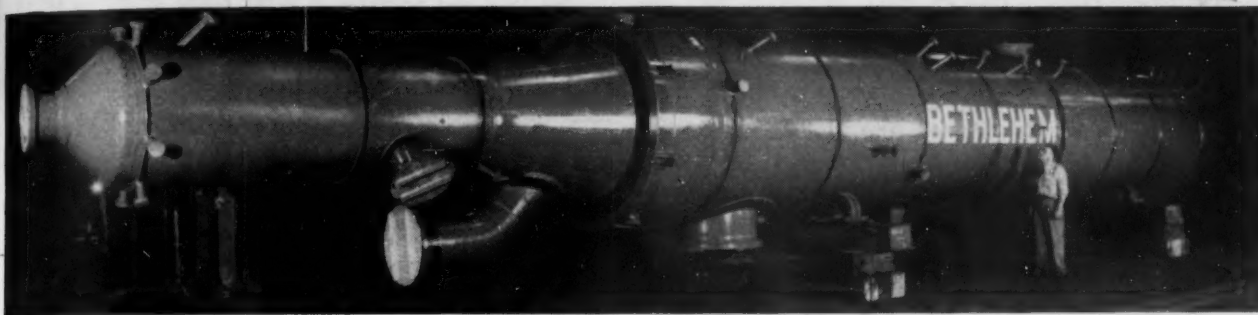
Electric Traveling Cranes

Whiting Corporation also manufactures Railroad and Aviation Equipment, Swenson Chemical Processing Equipment and Metal-Working Machinery.

# Tall Towers Made By Welding



**FRACTIONATING TOWER** — This 82-ft tower for an oil refinery weighs about 31 tons and is 8 ft in diameter. Its shell is made of steel plate — welded carefully to meet the vessel code of API and ASME. **EAST ENGINEERING**



**REACTOR TOWER** — Welded of both 7/16-in. and 5/16-in. steel plate, this 76-ft vertical tower weighs about 24 tons. Within the shell are some rather complex "innards." It's built to API-ASME vessel code for an oil-refinery process.



**BUBBLE TOWER** — Slightly more than 95 ft long, this chemical process tower tips the scales at nearly 30 tons. Tested hydrostatically to 756 psi, it's made of welded plate in both 1 1/16-in. and 7/8-in. thicknesses.

These big towers are typical of the complex types of equipment that are fabricated by our Weldment Shop — not just for chemical and petroleum processes but for builders and users of all kinds of machinery.

Bases, frames, assemblies, vessels, presses, large-diameter pipe work, autoclaves, kilns, tanks — all of these are economically made by welding together steel plates of varying thicknesses. Steel forgings, castings or structural shapes are often incorporated.

Here are some good reasons for looking into Bethlehem Weldments:

**ECONOMY** — Excess weight is eliminated, but at no sacrifice of rigidity or strength. This reduction in weight usually means a real saving in the total cost of machines or assemblies.

**FREEDOM OF DESIGN** — There's absolute freedom of design because the steel plate can be bent, pressed or shaped prior to welding without affecting its physical structure.

Either forgings, castings or structural shapes can be incorporated where desirable.

**VERSATILITY** — All sizes and shapes of steel can be welded together from blueprints. Weldments can be simple or complex parts, sections of assemblies, or finished machines.

★ ★ ★

Be sure to get our price the next time you need large machinery parts, frames or assemblies. You may be pleasantly surprised at the savings that are possible with weldments made in our well-equipped shops. Get in touch with the nearest Bethlehem sales office for full details.

**BETHLEHEM STEEL COMPANY**  
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



## BETHLEHEM WELDMENTS

November 19, 1953

★Starred Items are digested at the right.

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Address mail to 100 E. 42 St., N. Y. 17, N. Y.

## NEWS DEVELOPMENTS

**PLASTIC PIPE INDUSTRY COMES INTO ITS OWN—P. 89**  
Fanfare has died out in the plastic pipe industry—it's too busy for trumpets. Record sales are expected for 1953 and progress is being made in finding better raw materials and processing methods. Surest sign of new maturity is the drive for industry-wide standards. Different plastics compared.

**ALUMINUM SUPPLY ADEQUATE FOR ALL DEMAND—P. 92**  
The "great transition" is being made in aluminum, too. Like steel, it has shifted from scarcity to plenty as military cutbacks, inventory correction and manufacturing easing trim demand beneath ever-rising production. But there's little talk of over-expansion among optimistic producers.

**VIDEO SIGNALS ADJUSTMENT, NOT TROUBLE — P. 93**  
With Westinghouse dialing down prices and most of the industry reporting minor production cutbacks and layoffs, the television picture fogged up last week. Conclusions that trouble was at hand were out of focus. The industry is hitting an adjustment and output is being adjusted to match. Stocks not dangerous.

**LEWIS STARTS CONTRACT GUESSING GAME — P. 95**  
Usual guessing game on John L. Lewis' coal contract intentions is in full swing. Prevailing opinion is that he's biding his time. He can reopen contracts on 60 days' notice but has given no sign that he intends to do so in the near future. Low sales and high stockpiles blunt the strike threat.

**BATTELLE DEVELOPS NICKEL-SAVING ALLOY — P. 100**  
Researchers at Battelle Memorial Institute have taken the wraps off an iron-base alloy which gives promise of saving significant amounts of scarce nickel. Nominal composition: Mn, 16.5 pct; Cr, 10 pct; C, 0.12 pct; Cu, 2 pct; N, 0.12 pct; Si, 0.8 pct; and the remainder is iron. Structure is austenitic.

**CAN GM BREAK JINX ON WILLOW RUN PLANT?—P. 106**  
Auto industry circles believe that the huge Willow Run plant will lose its white elephant label, turn into a paying operation under General Motors management. But GM probably wouldn't have bought it if Hydramatic hadn't needed emergency quarters after the Detroit Transmission plant was gutted by fire.

# the Week in Metalworking

## ENGINEERING & PRODUCTION

**COLD EXTRUSION LINE FORMS 60-mm SHELLS—P. 147**  
Five cold extrusion presses form a complete line for production of 60-mm mortar shells. Estimated steel savings resulting from use of this method amount to 265,000 lb per month. Die design is a top factor in production by the cold extrusion method. Well-designed dies will turn out 150,000 pieces.

**EXTRUDED BOSSES SIMPLIFY SHEET ASSEMBLY—P. 151**  
Instead of punching flat fastener holes in sheet stock, extruded bosses provide faster, cheaper and stronger sheetmetal assemblies. Threaded bosses eliminate the need for nuts and give greater holding power to self-tapping screws. Pointed or bull-nosed punches are used. Holes may also be used for other purposes.

**GAS CONTROL HALTS DECARB IN TUBING — P. 154**  
Aircraft specifications set up tight decarburization limits for tubing. In a closely controlled operation at Michigan Seamless, specifications are not only being met, but are better than in normal tube production. Secret is in strict atmosphere carbon control. Generated nitrogen with CO, H<sub>2</sub> and CO<sub>2</sub> is used.

**HOW MACHINABLE ARE VARIOUS CAST IRONS—P. 158**  
Here's a guide to selection and machining of nodular, malleable and gray cast irons. Based on constant-pressure lathe tests, and correlated with physical properties of the materials, this guide can be used in your plant. Machinability of nodular iron is improved by annealing at 1650°F. Decreasing ductility may be key.

**NEW SETUP PROCESSES BRAKE LININGS FASTER—P. 162**  
Conveyors, furnaces, applicators and other equipment have been set up methodically at Chrysler's Lynch Road plant for bonding linings to brake shoes on a large scale. Continuous processing produces shoes at the rate of one per second. Three 100-ft long furnaces—two with five conveyor lines—cure the cement.

**NEXT WEEK—ADVANTAGES OF PRESSURE IN ASSEMBLY**  
Pressure, properly applied and controlled, has many advantages as a method of assembly. It may be used to force two closely fitting members together, or for riveting, staking or crimping two or more parts into a single assembly. Versatility is an important feature. Control is simple, and operation can be automatic.

## MARKETS & PRICES

**FREIGHT CAR ORDER BACKLOGS NEAR BOTTOM—P. 91**  
Vicious cycle in the freight car industry has reached a critical point. Order backlogs are down to little more than 4 months for commercial car builders, some 5 months for railroad shops. For the past 2½ years output has topped new orders in every month but one. Layoffs may come soon. Trend seen continuing.

**AIR CONDITIONING SALES TOP \$1 BILLION — P. 97**  
The \$1 billion sales mark which the air conditioner industry will hit this year is expected to be only a stepping stone to higher marks yet to come. Informed sources anticipate a \$5 billion annual gross for the industry within 10 years. Expect a third of all factories to be conditioned by 1965.

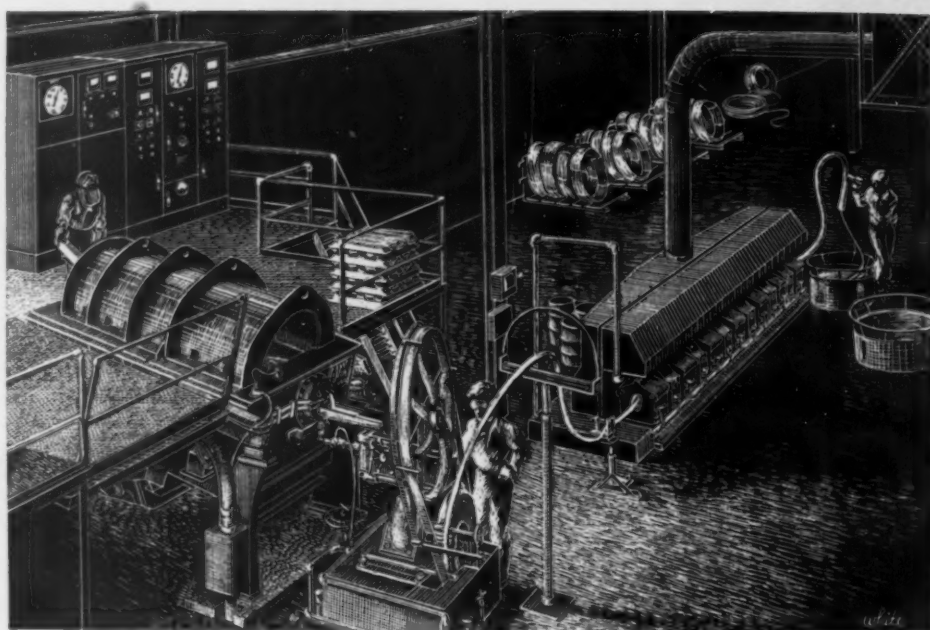
**CHEMICAL PRODUCERS GET SET FOR SALES DIP—P. 102**  
Sales executives in the chemical industry expect a slight dip for 1954. It'll be the first decline they've experienced since the late thirties. Sales averaged \$405 million monthly in '40, zoomed to \$1,678,000,000 monthly for the first 8 months of 1953. Equipment suppliers foresee continuing expansion.

**INDUSTRY OUTPUT REACHES DEMAND LEVEL — P. 119**  
Current bracing for competition, trimming of output and inventory did not result from a slump in consumer demand. What it means is that industry's productive capacity has grown to the point where supply slightly passed demand. Construction will continue at near-record in 1954. What easing income means.

**STEEL BUYERS SPAR FOR PRICE CONCESSIONS—P. 183**  
Steel buyers give plenty of assurance that they will continue to be in the market in a big way next year. Yet mills are receiving January orders very slowly. It looks as if buyers are sparring for the best possible price. Some frankly admit it. Nowhere is this more apparent than Detroit, where premium costs hurt.

**TRIM FIRST QUARTER ALUMINUM SETASIDE — P. 186**  
Softness already prevailing in the aluminum market will be accentuated during the first quarter by slimmer AEC and military setasides. BDSA has announced the defense quota of 97,000 tons for the first quarter of 1954. This is a cut of 20,500 tons. Meanwhile, remelt ingot and scrap are still rising.

# From Molten Aluminum to $\frac{3}{8}$ " Diameter Rod in $1\frac{1}{2}$ Minutes!



## Rome Cable Corporation

uses

# AJAX

INDUCTION FURNACES

for

### MELTING ALUMINUM FOR CONTINUOUS CASTING AND ROLLING OF HIGH CONDUCTIVITY ROD

The picture above, a drawing made at the Rome Cable Corporation, Rome, N. Y., shows one of the most modern installations in the country for the continuous casting and rolling of aluminum rod. From left to right are shown the electric controls of the adjacent 450 kw. AJAX low frequency induction combined melting and holding furnace which is pouring molten metal into the Properzi continuous casting machine in the foreground, and the rolling mill from which the coiled rod is emerging.

This installation casts at the rate of about one ton per

hour. The furnace feeds a continuous stream of molten aluminum at automatically controlled temperature into a rim cavity on the slowly revolving wheel of the Properzi machine. Metal loss from pig to rod averages less than 1 pct. Mechanical properties and electrical conductivity are excellent; the material is sound and fine grained. The men work under cooler, cleaner conditions because the only heat generated is within the melt itself. Due to melting conditions inherent in AJAX furnaces, the operation is continuous and no fluxing is required.

# AJAX

TAMA-WYATT



## AJAX ENGINEERING CORP., TRENTON 7, N. J. INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies  
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# THE IRON AGE

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Offices, 100 E. 42nd St., N. Y. 17, N. Y.  
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## Editorial

The Iron Age

FOUNDED 1855

# You And Our Foreign Policy

THERE are still many businessmen who ask, "What has Russia to do with my business?" Or they might say, "How does our foreign policy affect my way of doing things?"

Just as you have to figure out what's ahead in business and just as you have to figure out what labor will be after—so do you have to guess at the international outlook. It is now a factor in your business.

Here are a few developments we think you can look for in 1954:

¶ There will be no slow-down in the atomic race from our standpoint. If anything it will be stepped up without too much regard for cost. This is the thinking of those who are in a position to do something about it.

¶ Public opinion has and will back up Congressman Sterling Cole, chairman of the joint committee on atomic energy, in his feeling that it is better to unbalance the budget than risk our country.

¶ Military men's stock will go up in 1954. Also, this overdue correction plus a firmer hand on the part of President Eisenhower may mean Mr. Wilson will wield less influence than he does now. Mr. Wilson has been rebuked twice by the White House. He is in trouble with the press and has been at odds with many congressmen.

¶ The breach between England and the U. S. will narrow in 1954. Main sore spots—Korean policy and Churchill's insistence on a Big Four meeting—are out of the way.

¶ The cold war is a long way from coming to an end or even slowing down. This means that your taxes—in the overall—will not come down too much as long as we have to keep defense costs up, which we will do.

Those in charge of our policies now will not be taken in by Communist propaganda since they don't deal in wishful thinking. For that reason there will be no move to glorify Malenkov and get caught like others did at Yalta, Teheran and Potsdam. Furthermore, present Administration people have to live down Korea.

All these factors will bear on your business and must be taken into account even though they are calculated guesses. Our foreign and domestic policies are irrevocably intertwined—and will be that way for a long, long time.

Tom Campbell

Editor



■ Composite photo showing a drum of chemicals being put through a variety of handling motions by the Baker "Octopus."



## This BAKER TRUCK handles any shape load ... *and stacks it in any position!*

■ You name the load—the Baker "Octopus" illustrated will handle it, whether it's a drum, a roll of newsprint, a packing case, a piece of machinery, a bale of cotton or a pallet load of cartons. Moreover, it will pick it up, transport it, raise or lower it, shift it to left or right, revolve it, up-end it, or stack it in any position. In fact, it will handle it with no more physical effort than is needed to operate the simple hydraulic controls.

The "Octopus" consists of a standard Baker Fork Truck equipped with a variety of Baker attachments—360° revolving head, 4-purpose carriage, up-ender, drum clamp, etc.—which may be applied individually or in combinations. While one truck may never be called on to perform all these functions, the "Octopus" demonstrates the range of utility of Baker fork trucks and attachments.

**Baker**

**industrial trucks**

*write for*

6-page special report on the application of Baker attachments to various loads.

**THE BAKER-RAULANG COMPANY**  
1227 WEST 80th STREET • CLEVELAND 2, OHIO

BAKER-LULL Corporation, Subsidiary, Minneapolis, Minn.  
Material Handling and Construction Equipment.

# Dear Editor:

## Letters from readers

### Porcelain Enameled Pots

Sir:

In your issue of Oct. 1, on the Newsfront page, reference is made to the manufacture of porcelain enameled cast iron pots and pans and the demand for same created by the sale of the foreign product.

Since we are in the foundry business, we would appreciate receiving more information on this item.

T. S. DRAKE  
Works Manager

The Anthes-Imperial Co., Ltd.  
St. Catharines, Ontario

Further information about these cast iron pots may be obtained from the Porcelain Enamel Institute, 1346 Connecticut Ave. N. W., Washington, D. C.—Ed.

### Full Wheel Power

Sir:

In your Oct. 1 issue, on the page entitled "Newsfront" we noted the article about a new type of transmission which drives laterally rigid wheels giving full power on every wheel and top wheel-turning efficiency.

Could you please tell us where we may obtain more information on this subject?

E. T. EVANS  
Librarian

Cornell Aeronautical Laboratory  
Buffalo, N. Y.

You may obtain further information on this new type of transmission from the Society of Automotive Engineers, 29 West 39th St., New York, N. Y.—Ed.

### Hand Gage

Sir:

We noticed in THE IRON AGE issue of March 12, an article entitled "Hand Gage Accurately Measures Paint Coat Thickness." We should be pleased to have some more information about this hand gage. If possible, would you please send us the name and address of the manufacturer?

S. FELIN

Punhard & Levassor  
Paris, France

The manufacturer of this electro-magnetic hand gage is the Henry A. Gardner Laboratories, 4723 Elm St., Bethesda, Md.—Ed.

### Cast Refractories

Sir:

May we please have four tear sheets of the article "Cast Refractories Lower Heat Treat Furnace Costs" which appeared on p. 113 of the Oct. 22 issue of THE IRON AGE?

T. G. EDGEWORTH  
Reduction Division Supt.

Aluminium Co. of Canada, Ltd.  
Shawinigan Falls, Quebec

### Carbon Steel for Bolts

Sir:

In the Sept. 11 issue, p. 153, there is a technical article entitled "Carbon Steel Can Replace Alloy for Small Diameter Bolts."

We are very interested in this article and would appreciate receiving two tear sheets of it at your earliest convenience.

M. RUSTICK  
Engineering & Research Dept.

Elastic Stop Nut Corp. of America  
Union, N. J.

### Automatic Process Control

Sir:

Would you please send us a reprint of the article "Automatic Process Control" which covered pp. 273-320 in the Oct. 8 issue of THE IRON AGE?

E. B. MORROW  
Librarian

Quaker Chemical Products Corp.  
Conshohocken, Pa.

A few reprints are still available.—Ed.

### Alloy from Flux

Sir:

If possible, please send me 20 tear sheets of the article "Flux Supplies Alloy for Hard Surfacing Manipulators" which appeared in the Oct. 29 issue. I would also like to receive the corresponding number of tear sheets of the Technical Brief entitled "Heat Treating" which appeared on p. 110 of the same issue.

J. P. OSTERMAN  
Advertising Manager

Ajax Electric Co., Inc.  
Philadelphia, Pa.

### Hard Chrome Solutions

Sir:

We would very much appreciate receiving two tear sheets of the article appearing on p. 126 of the Oct. 22 issue which is entitled "Hard Chrome Solutions—Which Offers Better Plating Properties?"

J. O. POWELL

Mgr. Engineering Laboratory  
Menasco Mfg. Co.  
Burbank, Calif.

### Four Years Later

Sir:

Will you please send us six additional tear sheets of the article "Cold Extrusion of Steel" which appeared in the Aug. 4, 1949, issue of THE IRON AGE?

T. F. KEEGAN

Lansing Drop Forge Co.  
Lansing, Mich.



## for a tighter hold

Torrington Swaging Machines produce pointed ends on both solid and tubular work to close tolerances. The swager, delivering 4000 hammer blows a minute, works rapidly and gives the metal toughness and resiliency. Swag-

ing is economical, too, for there is no stock waste.



"The Torrington Swaging Machine" tells the story on the art of swaging, and describes the complete line of Torrington machines. This informative booklet is yours for the asking.

**THE TORRINGTON COMPANY**  
Swager Department

555 Field Street • Torrington, Conn.

Makers of

**TORRINGTON NEEDLE BEARINGS**

*for heat treating*

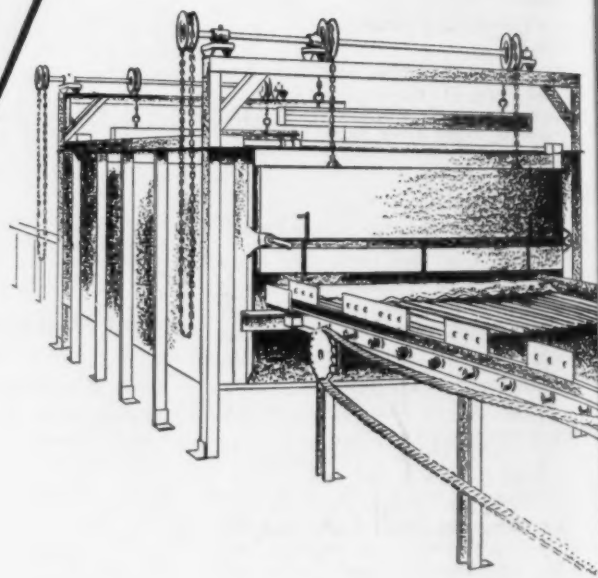
**ihp** \*

## **IMPROVES QUALITY**

Non-ferrous tubing annealed in this furnace at a rate of fifty pounds per minute has such uniformity in grain size that differences cannot be detected. Oxidation is minimized by a reducing atmosphere, proportioned and kept at constant pressure by a mechanical mixer. Temperatures up to 1200° F. are used, depending upon the type of anneal required.

Results from this Selas furnace are typical of those achieved through the use of *Improved Heat Processing* . . . a term embodying improved methods and modern equipment.

Used in all types of industries, *Improved Heat Processing* is popular for ferrous and non-ferrous metal working and treating. Further information on any Selas process will be sent upon request.



*\*Improved Heat Processing*

# **SELAS**

**CORPORATION OF AMERICA**  
**PHILADELPHIA 34, PENNSYLVANIA**



*Heat Processing Engineers for Industry • Development • Design • Manufacture*

# Fatigue Cracks

by William M. Coffey

## Who Say Dat?

What is life? It's just one continual round of getting into and out of jams. *That's* life. And the successful man is the one who gets out of them best. We've made a study of successful men and the techniques they have developed to get out of jams.

You can muster every ounce of sincerity and say "who me?" Or look the accuser dead in the eye and just say "oh?" Or spit out a biting, "what the devil are you talking about" in a voice of cold (drawn) steel. Some even own up with a laughing "we sure fumbled the ball that time didn't we, old pal?"

But the best of them all is a brand new one—*Snolly-gosterism*. It doesn't make sense, no one knows what it means, but when it comes to getting out of a jam it's a beaut. Think of the applications! Everybody can use it.

Picture the young son explaining to his father about flunking a spelling test. "Now, son, what about that test," says pop. Before snolly-gosterism, the son may have used the "what the devil are you talking about" technique. Now? "Gee whiz, dad, they're all a bunch of snolly-gosters over at that school." "I understand, my boy," the father chuckles. "Could happen to anyone."

The football game lost by a fumble. The marine on the beachhead who forgot his rifle. The thief caught with his hand in the till. The employee always late. The salesman losing an easy sale. It's all on account of them snolly-gosters.

Use it yourself. As we said, it's a beaut.

## Salute to the South

Some of the finest compliments THE IRON AGE has ever received were generated by last week's Salute to the South, the special big section. All of us here are particularly happy about its reception because it's another "Tom Campbell Story." The idea originated with Editor-in-chief Tom and it was his enthusiasm that nursed it along. Tom spent almost as much time in the "deep" as did Sherman; talked with everybody in big plants and little plants—and judging by the letters received he made quite a few more friends than old Tecumseh. If you missed Salute to the South go back and study it.

It's the best analysis of the South's progress and potential you

can get—even if we do say so in Fatigue Cracks and we do say so. After this one Tom could relax a little but rumor has it he's on the West Coast, probably doing the same kind of a story.

Slot man was Ned Kellogg.

## Readership

Tell you something about the publishing business. We don't want circulation. We want *readership*. We could send THE IRON AGE to 1,000,000 people, but if just 35,000 of them read it, what good does it do them or us? See?

Now tell you something about readership—and this is sort of a report to the publisher. We've found the best reader we've got. He's our 2-year-old-son. (This editorial "we" and "our" sometimes doesn't make much sense, does it? It's actually *my* son, but because we write this column we have to credit this son to 24 full time editors, the publisher, Charlie Lippold, the printers and everybody else as if they had something to do with it. *My* son, mind you.)

This kid appreciates THE IRON AGE so much that he tears out each page and reads it separately. (Note to the publisher: Yes, sir, I know THE IRON AGE costs a lot of money. But father to father what can we do about *our* son?) Keep a subscription in mind for your child this Christmas. It makes a wonderful toy. It's so colorful and so big. Biggest in the world.

## Puzzlers

Even after the "Phew," which we thought would be a pretty good warning, look at just some of the winners to the 2-digit number thing (answer: 105, 263, 157, 894, 736, 842)—Linwood C. Robinson, Bob Brown, Jim Giopulos, Maurice P. Herrick, Norman H. Ferguson, Louis J. D. Berardo, I. M. Bettman, good ole Milo Bowman, Franklin R. Ross, C. A. Hefferman, Milton C. Kister, good ole Paul Tackett, Cyrus D. Senger, T. A. Johnson, Peter H. Jacoby, W. R. Bekebrede, Jack Miller, Wade Greer, Don Wharton, Donald L. Upp and Mr. Rice.

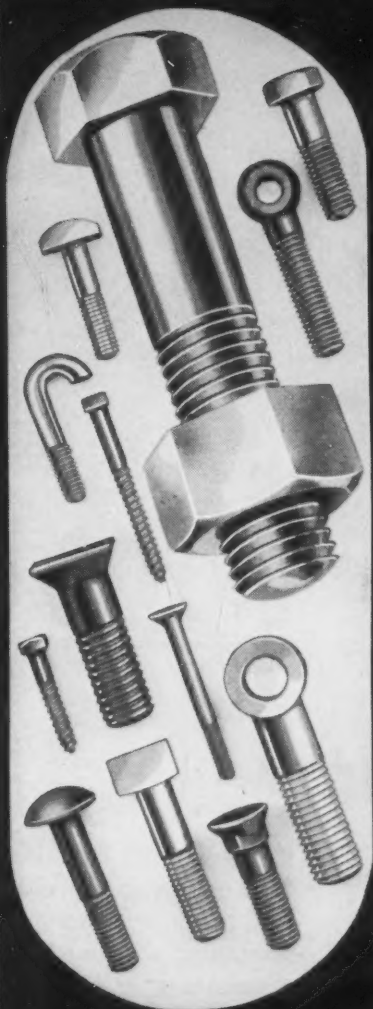
## New Puzzler

You have 21 coins which total \$1.00. The question is how many different combinations can you have. The one with the highest number is the winner.

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- Stainless Steel
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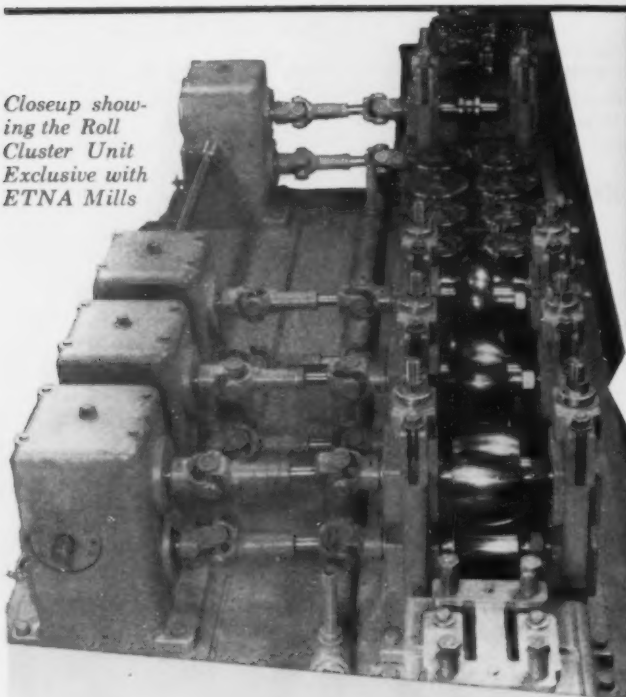
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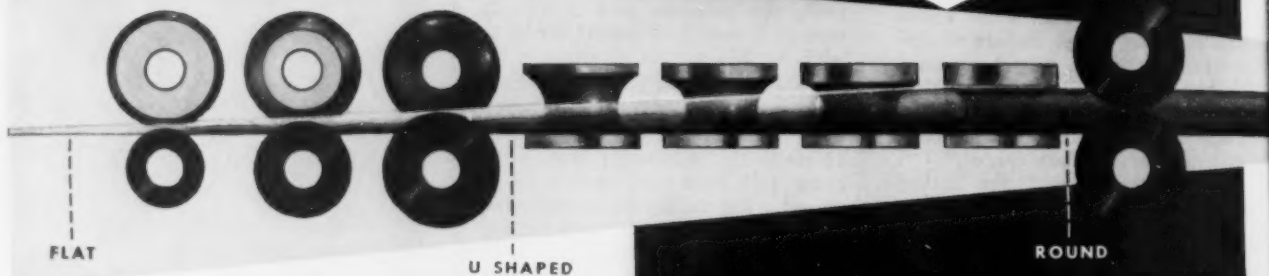
**LEADING THE INDUSTRY IN DESIGN...**

*Closeup showing the Roll Cluster Unit Exclusive with ETNA Mills*

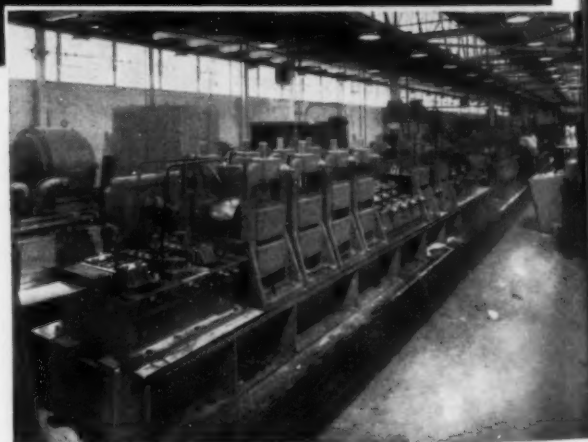


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# THE IRON AGE Newsfront

**JOB SECURITY MEASURES** have replaced strictly economic factors at the top of the United Automobile Workers priority list. UAW, already laying groundwork for a guaranteed annual wage drive, believes it has an issue because of recent layoffs and shorter hours.

**COMPANIES HAVE BEEN SO BUSY** making products more attractive that some have stressed deluxe models at the expense of standard bread-winners. Result: Costs outpaced customers. Look for more low-cost standard models designed for more pocketbooks.

**RESEARCH ON SHELL MOLDING** and related precision casting processes goes on steadily though quietly. GM is already using a number of shell molded products. Crankshafts are being made by one GM division. Two other GM units are expected to have shell molded products in production by late 1954.

**IT'S NO SECRET** that no job is more difficult than government economy. Eliminating one administrative post may touch off a long series of job bumping. Example: 60 pct of people in Bureau of Foreign Commerce are in different jobs than they were one year ago.

**SHIELDS FOR RADIOACTIVE SUBSTANCES** are providing a limited but important new field for metalworking manufacture. The Atomic Energy Commission is now attempting to standardize capsules for easy handling and carrying of radioactive material.

**SOME HIGH GOVERNMENT SOURCES** believe overall business activity in the economy may be off about 10 pct in the first half of 1954. This explains why they are watching business trends closely, but are so far not alarmed. Feeling is that if decline is not greater than anticipated, all will be well.

**A NEW ELECTRONIC SIGNAL TRACER** has been developed by the Navy to help locate and remedy difficulties in delicate communications equipment. The bench-type tracer is still an experimental instrument. In locating trouble, it uses a tuned radio-frequency probe, an audio probe, and a "noisy component" probe.

**REDUCTION IN NUMBER OF INDUSTRY ADVISORY COMMITTEES** is the goal of Commerce Secretary Weeks for future emergencies. In the past, each government branch had its own advisory group--which meant duplication and waste.

**PLASTIC PIPE MAKERS EXPECT** total industry sales for 1953 to climb to about \$20 million, an increase of \$5 million over last year's total. Increase is attributed to wider acceptance in agricultural and mining industries, and in the oil country.

**PATENTS MAY COST A LITTLE MORE** under present Washington plans to put the Patent Office on a paying basis. It now spends some \$12 million a year and takes in about \$6 million.

**INJURY RATE IN PRIMARY METALS INDUSTRIES** last year was 15.5 per million man-hours worked. Rates in manufacturing and most nonmanufacturing lines dropped below the 1951 average. In fabricated metal products plants, the rate was 18.1. Some other industry rates: Lumber and wood products, 49.6; construction, 34.6.

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# PLASTIC PIPE: Less Fanfare, More Sales

**Industry expects to set sales record of \$20 million this year . . . Consumer price has been halved in 5 years, more cuts expected . . . Work on standards—By R. M. Lorz.**

Sound of trumpets and fanfare has died down in the plastic pipe industry. Record sales are expected this year and progress is being made in finding better raw materials and processing methods.

But as the industry expands and ages, it is becoming more conservative. Outlandish claims are being left to outsiders. Producers are too busy with standards, markets, and lower costs.

Since the first commercial pipe was sold in 1948, new methods of processing the lightweight substitute have been popping up regularly. A few are proving practical. Many have been dropped.

## Work on Standards

Surest sign that pipe makers are emerging from swaddling clothes is found in the movement toward standards. First move has been made by extruders who make thermoplastic pipe. At least 15 of these firms banded together recently to set up specs which should put a solid floor under the industry.

Need for standards is pressing. Techniques are improving, better pipe is rolling off production lines, but regulation will have to come. Without it prospective sales will be hurt by the suspicion which hampers acceptance of anything new.

## Expect \$20 Million Sales

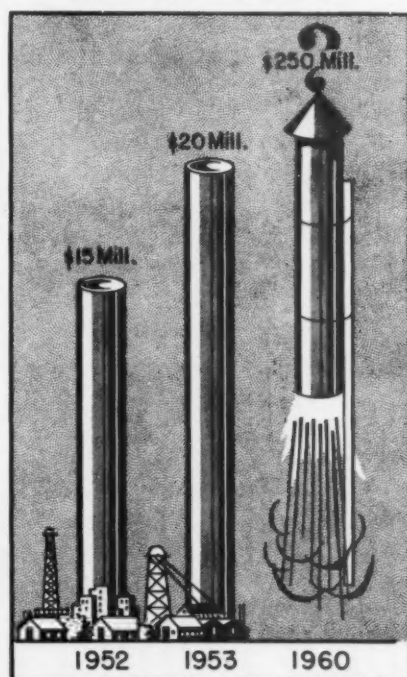
When some of these barriers are removed demand may soar. Pipe producers say they expect to see the industry's sales graph continue to climb. Last year total sales reached an estimated \$15 million. As 1953 draws to a close

producers expect the total to jump to \$20 million. The increase can be traced to growing demand in rural, suburban, oil country, mining, and municipal areas. Industrial and plumbing fields remain challengingly untapped.

## Cut Price in Half

Discussion of market development usually flushes out some rabid optimists. Some predict annual sales of at least \$250 million by 1960. Conservative thinkers realize this figure represents one-fifth of 1952's entire ferrous market and don't believe the market will grow that fast. They say the basic problem of achieving greater resistance to heat and pressure at less cost will take some time to solve.

## Plastic Pipe Sales Growth



Progress in the direction of lower costs so far is encouraging. In 5 short years, a 50 pct reduction in consumer prices has been effected. Bulk of further cutting will probably come from lower raw materials costs.

Raw materials now account for an estimated 80 pct of total cost per foot. Heaviness of this load is partially the result of a chronic shortage of materials. Chief sources of domestic supply thus far have been Du Pont and Union Carbide & Carbon. Recently Dow Chemical, Monsanto and Spencer have announced plans to enter the field.

## Some Have Arrived

This expansion should not only increase supply but also lower consumer costs. Research on new materials also offers possibility of a cheaper combination of raw materials. Finally technicians and researchers don't overlook likelihood of discovering a whole new family of resins that would change the picture completely.

At the moment, polyethylene, polyvinyl-chloride and cellulose acetate butyrate (Tenite) form the raw materials big three. Reflin's thermosetting pipe (reinforced with fiber glass) also shares the spotlight. The more flexible polyethylene is being used in over 75 pct of the pipe now marketed. However, Eastman's Tenite and PVC are gaining rapidly. If costs can be reduced, the temperature resisting qualities of these products should make them highly desirable.

## Selling Points

All four have great market value now because of lightweight, ease of installation and low maintenance cost. In some instances

Turn to page 91

# PROPERTIES OF COMMON MATERIALS USED IN PLASTIC PIPE

## Special Report

Properties	Cellulosic Molding Compounds Cellulose Acetate Butyrate (Tenite II)	Vinyl Molding Compounds Rigid (PVC) Excellent	Vinylidene Chloride Molding Compounds (Saran) Excellent	Styrene Copolymer Molding Compounds Heat & Chemical Resistant Type Good	Acrylonitrile Resin-Rubber Molding Compounds Good	Polyethylene Molding Compounds Excellent
Molding/qualities	Compression molding temp., °F 265-390	Compression molding temp., °F 280-350	Compression molding temp., °F 220-350	Compression molding temp., °F 300-400	Compression molding temp., °F 250-325	Compression molding temp., °F 275-300
Compression molding pressure, psi	500-5000	1500-2000	500-5000	1000-5000	1000-8000	200
Injection molding temp., °F	335-480	310-385	300-400	350-700	375-600	300-500
Injection molding pressure, psi	8000-32000	20000-30000	10000-30000	10000-30000	6000-30000	8000-15000
Compression ratio	2.0-2.4	2.0-2.4	2	1.6-2.4	1.6-2.4	2.1-3.6
Mold shrinkage, in. per in., injection	0.001-0.005	—	0.005-0.025	0.002-0.008	0.002-0.01	0.02-0.05
Mold shrinkage, in. per in., compression	0.003-0.009	—	—	—	—	—
Specific gravity	1.15-1.25	1.35-1.55	1.65-1.72	1.05-1.11	0.98-1.10	0.92
Specific volume, cu in. per lb.	24.2-22.2	20.5-17.8	16.8-16.1	26.2-24.8	28.1-25.2	30.1
Refractive index, $n_D$	1.46-1.49	—	1.60-1.63	1.57-1.60	—	1.51
Tensile strength, psi	1900-6800	8000-9000	3000-5000	7000-12000	3500-7000	1500-1800
Elongation, pct	38-75	—	Up to 250	1.5-2.5	10-30	50-400
Modulus of elasticity in tension, 10 <sup>5</sup> psi	0.7-2.0	5	0.5-0.8	4-6	1.8-4.0	0.19
Comprehensive strength, psi	7500-22000	—	—	11500-16000	4800-9000	—
Flexural strength, psi	1500-9300	14000	—	10000-17000	—	—
Impact strength, ft-lb per in. of notch ( $\frac{1}{2}$ x $\frac{1}{2}$ in. notched bar, Izod test)	0.6-5.4	0.4-0.75	0.3-1.0	0.25-0.50	0.5-11.0	16
Hardness, Rockwell	R60-R115	—	M50-M65	M65-M90	M20-M40, R50-R100	R11
Thermal conductivity, 10 <sup>-4</sup> cal per sec per sq cm per 1° C per cm	4-8	3.5-4.0	3.0	1.9-3.0	1.0-3.0	8.0
Specific heat, cal per °C per gm	0.3-0.4	—	0.32	0.32-0.35	0.32-0.35	0.55
Thermal expansion, 10 <sup>-5</sup> per °C	11-17	—	19	6-8	3.4-21	16-18
Resistance to heat, °F (continuous)	140-220	130-160	160-200	170-200	140-175	212
Heat distortion temp., °F	120-210	140-185	130-150*	190-235	148-200	(66 psi)
Water absorption, 24 hr, $\frac{1}{8}$ -in. thickness, pct	1.1-2.2	0.3-0.6	0.1	0.05-0.40	0.15-0.55	0.01
Burning rate	Slow	Self-extinguishing	Self-extinguishing	Slow	Slow	Slow
Effect of sunlight	Slight	Darkens on prolonged intense exposure	Slight	Yellows slightly	Some strength loss	Colors may fade
Effect of weak acids	Slight	None	None	None	None	Resistant
Effect of strong acids	Decomposes	None	Highly resistant	Attacked by oxidizing acids	Attacked by oxidizing acids	Resistant by oxidizing acids
Effect of weak alkalis	Slight	None	Resistant	None	None	Resistant
Effect of strong alkalis	Decomposes	None	Resistant	None	None	Resistant
Effect of organic solvents	Soluble in ketones and esters; softened or slightly soluble in alcohol; little affected by hydrocarbons	Resists alcohols, aliphatic hydrocarbons and oils. Soluble in ketones and esters; swells in aromatic hydrocarbons	Resistant	Soluble in aromatic and chlorinated hydrocarbons	Soluble in aromatic and chlorinated hydrocarbons	Soluble in aromatic solvents above 60° C.
Effect on metal inserts	Inert	Inert	Inert	Inert	Inert	Inert
Machining qualities	Good	Good	Good	Fair to good	Good	Good
Clarity	Transparent to opaque	Transparent to opaque	Transparent to opaque	Transparent (90% light transmission)	Translucent	Translucent to opaque
Color possibilities	Unlimited	Unlimited	Extensive	Essentially unlimited	Translucent and opaque	Unlimited

Source: Hale &amp; Kullgren Inc., Akron, Ohio.

Continued from Page 89

they have already arrived market-wise.

Recently two men and a boy laid a 9-mile oil pipeline in the Williston Basin in 5 days. The butyrate pipeline cost \$75,000. Luther Simons, owner of the pipeline, estimated that a ferrous line would have cost \$100,000. Other examples: makers of polyethylene pipe say jet-well installations are cheaper if plastics are used.

Ferrous tube makers are aware of these developments. At least three mills have entered the field either through experimentation or direct production.

### No Competitive Overlapping

Steelmen are just dabbling at present. They have no immediate plans for going into plastics in a big way. Reason for their go slow attitude is readily apparent; there is a definite field for both products.

In a broad sense, until the cost factor is licked, plastic pipe will be useful only in installations which won't subject materials to temperatures over 140°F and pressures of 100 psi. Need for oil country, agricultural and municipal pipe falling into this category is great, though increased steel supply may ease demand for oil country goods.

### One Company's View

In some quarters informed sources believe steel firms will be satisfied to serve as marketers. Sentiments like these indicate that there is currently very little competitive overlapping of plastic and steel pipe.

President Ernest E. Swartswelder of Pittsburgh Aetna-Standard Engineering Co., is in a good position to talk from both sides of the fence. In announcing Aetna-Standard's entry into the plastic extrusion field 3 years ago, Mr. Swartswelder said, "I think plastic pipe has a great future. However, Aetna-Standard has always been the leader in production of ferrous pipe mills and we expect to continue in that role for a long time."

## FREIGHT CARS: Backlogs Near Bottom

**Production remains ahead of new orders, as car builders' backlogs continue to plummet . . . Estimated at 4 months' level . . . Layoffs may come soon—By E. C. Kellogg.**

Freight car industry's vicious cycle has hit the critical point. With the exception of one month during the past 2½ years, freight car production has continued to outstrip new orders. Backlogs for commercial car builders are now down to little more than 4 months, while railroad shops have enough work for about 5 more months. (THE IRON AGE, June 18, 1953, p. 94.)

Seriousness of the situation was accentuated during October, when new freight car deliveries hit 8727, high for the year, while new orders amounted to only around 1705 cars.

### Slump Won't Stop

Order backlogs for both commercial car builders and railroad shops totaled 35,171 on Nov. 1, a drop of about 42,000 since the beginning of the year. Commercial car builders now have orders for 21,128 of the total; railroads, 14,043.

Industry spokesmen do not expect the decreasing backlog trend to stop. They point out that railroads are being caught in a squeeze. Earnings are low, amounting to 4.1 pct last year, freight cars expensive, averaging \$6,000 a piece. In addition, railroad workers are pressing for wage increases, fringe benefits, amounting to about \$1 billion, enough to wipe out the railroads' total net profits which last year amounted to \$1,078,454,945.

### Threaten Government Action

Result is railroads are showing little inclination to invest in new cars. They will be forced to keep on buying some, but their orders are already far below the amount needed to match their currently subnormal freight car replacement rate.

Interstate Commerce Commission has vaguely threatened that

the government might have to step in and buy cars itself or find a way to force the railroads to place more orders.

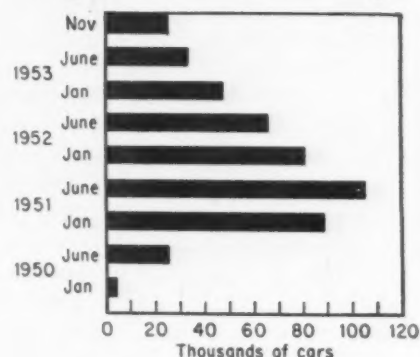
Industry sources, however, regard the possibility of government intervention as unlikely and believe ICC is using this as a threat to prod the railroads into buying more cars. The effort will probably not be too effective.

### Cars Would Cost More

General industry feeling is that the current trend of declining backlogs will continue and that car builders will have to start laying off some of their 21,487 workers. It is not believed that any carmakers will be forced out of business, but many will undoubtedly have to shut-down some of their facilities. Since most car builders started to diversify production several years ago, it is expected that they will center their efforts on this end of the business when their order backlogs give out.

As one spokesman for the car builders pointed out, if the builders do have to close down some of their facilities and new demand for freight cars develops, someone will have to pay for the cost of the shutdown period—meaning the price of freight cars would go up.

### Freight Car Builders' Backlogs



# ALUMINUM: Supply Passes Demand

**Light metal makes transition from seller's to buyer's market . . . Three causes are military cutbacks, inventory correction, industry easiness—By R. L. Hatschek.**

Aluminum, like steel, is in the midst of a "great transition"—the shift from shortage and high pressure procurement to adequate supplies and market easiness. And the contributing factors closely parallel those affecting the steel market.

Softness is felt pretty much up and down the line of mill products. In most cases delivery can be made in 4 to 8 weeks. Even sheets, which are the least soft, can now get onto mill schedules for December.

## Stretchouts Biggest Factor

Not very long ago most mills were booked solid for sheet through the end of the year but there have been some order cancellations and producers are scheduling stock runs for December. This material will go to aluminum warehouses.

What's causing the softness? Three factors: (1) Declining military use, (2) inventory correction and (3) generally easier conditions in manufacturing industry.

Air Force stretchouts have cut military consumption by probably 20 pct. This is the biggest single contributing factor and also is partially at the roots of the second factor. Since the military consumes a large portion of the hard alloys, these have dipped more sharply than others.

In the extruded products category, for instance, Aluminum Assn. shipment figures show hard alloys declining from 4532 tons in July to 3527 tons in August and to 2604 tons in September. For these same three months, shipments of soft alloy extruded products increased slightly.

With military cutbacks, aircraft producers and other suppliers of Armed Forces aluminum products find that their inventories are adequate for longer production periods. Hence they've trimmed new buy-

ing. And other aluminum users find they can get mill products with shorter delivery lead time so they're cutting down on inventory.

With the market softer, much over-buying and multiple ordering has faded from the picture and many consumers are now eating up inventories.

## No Capacity Gripes

Overall easing of manufacturing from boom to more normal operations also reduces demand for aluminum as it does for steel and other metals.

With no big order backlogs, aluminum salesmen are out tramping the pavement again. The metal's supply is adequate to meet all demand today. But there's little talk heard of overexpansion. Nobody's complaining about new primary production records or vastly

increased reduction capacity. And no potlines are out of production because of reduced demand.

Decreasing orders have, however, forced the layoff of workers on rolling operations of Kaiser Aluminum & Chemical Corp.

Latest industry output record was set in August with a total of 110,545 tons. The figure dipped to 109,333 tons in September, but this is a shorter month and the daily average is actually higher than August's. Production tallies for October will most likely be slimmer as a result of power shortages in the Tennessee Valley area.

Hydro power is short in both the Northwest and the Southeast and many potlines are being kept in production only with premium-priced steam-generated power. A few lines are down at Aluminum Co. of America's plant at Alcoa, Tenn.

## See Wider Use

Biggest unknown in the picture—and the one causing the most optimism among aluminum producers—is the latent civilian demand for aluminum. Many new civilian applications have been found in the past few years. But many of them have never been fully developed because of the war-imposed restrictions in supply.

The very fact that manufacturers couldn't get aluminum in the recent past is causing optimism among producers. They reason that many untried applications will make themselves felt now.

Increased capacity is another factor favoring the producers. Some manufacturers who might have adopted the light metal long ago felt that supply was too insecure because the industry was so small. This argument is fading away.

While the shortage is definitely over, the industry is looking forward to a pickup in business—probably early in 1954. By then it's expected that military and civilian use will have leveled out. Inventories will probably be corrected and balanced by then and normal buying resumed, though the volume will be a bit lower than early this year.

## Aluminum Products Shipments Net Tons

	Sept.	Aug.	July
Sheet & Plate:			
Heat-Treat	13,014	12,797	12,722
Non " "	37,746	38,855	40,897
Total	50,761	51,653	53,619
Foil	4,770	4,631	4,703
Extruded Products:			
Soft Alloys	8,950	8,746	8,475
Hard "	2,604	3,527	4,532
Total	11,554	12,273	13,007
Tube, Drawn & Welded:			
Soft Alloys	2,096	2,096	1,804
Hard "	549	717	578
Total	2,645	2,813	2,383
Rod & Bar*	9,120	8,108	9,082
Wire, Bare:			
Conductor	2,920	3,616	5,033
Not "	1,533	1,334	1,709
Total	4,453	4,950	6,742
Forgings	1,640	1,953	2,225
Castings:			
Sand	1,454	1,589	1,748
Perm. Mold	5,368	5,002	5,271
Die	5,130	5,182	5,333
Total	11,951	11,773	12,352

\*Excludes extrusions

Source: Aluminum Assn.

# VIDEO: Signals Adjustment, Not Trouble

**TV output picture fogs up with price cuts, layoffs . . . Industry making transition, adjusts production . . . Inventory not dangerous but cues producers to caution—By T. Metaxas.**

With Westinghouse dialing down prices and most of the industry reporting minor production cutbacks and layoffs, the television picture fogged up last week. Tuned in were out-of-focus implications of inventory jam-ups short circuiting factory output, possibility of incipient price slashing and ebbing demand.

## Regulate Output

Transmitting signals of adjustment rather than trouble, the TV industry nowhere showed serious interference with current or future demand. Yet a transition for the field was evolving. After a boom-tide of sales and production this year, there was evidence that expanded production had not only edged past record demand but meanwhile padded inventory.

With the sales rate high, inventory is not regarded as hazardous—but it is lofty enough to make the industry seek to regulate its production tempo. Output schedules are being kept under surveillance to forestall any further increase in inventory, are whittled when necessary. The bulk of the industry is basking in optimism, despite many admissions that consumer demand may edge slightly down.

## Cue to Caution

Despite some curbs on output, total 1953 production will reach a record level of about 7.5 million sets against 6.09 million last year. In the period of 12 months ending last September an incredible 7.95 million sets came off assembly lines.

There are softening signs, although hard and fast down trends have not ripened. September and October production this year were below 1952. Although registering a large seasonal jump over August, September retail sales of 753,953 units were nevertheless be-

low September 1952's 875,290. Yet sales for the first 9 months '53 were 4.3 million compared with 3.4 in 1952. Growth of the market this year has been substantial.

Cueing the industry to caution is an inventory situation which although generally in balance with demand is regarded as "high enough." It is estimated that more than 2 million sets are in warehouses of factory, distributor, retailer. At the start of the year only about 1.2 million sets were in this pipeline.

Prompting cutbacks then, factory inventory in August 1951 was 715,313 sets. The boom's upsurge dropped this stockpile to 172,631 sets at the end of September 1952, giving the industry sufficient margin to produce prodigiously to catch up with demand. As of June, 1953, stocks had risen to al-

most 700,000, with a larger number in distributor-retailer hands. Radio-Electronics, Television Manufacturers Assn. has clamped a secrecy lid on inventory statistics after that month.

Adjustment of production schedules occurring in the industry derive not so much from faltering demand as from expanded supply and a desire to control inventories.

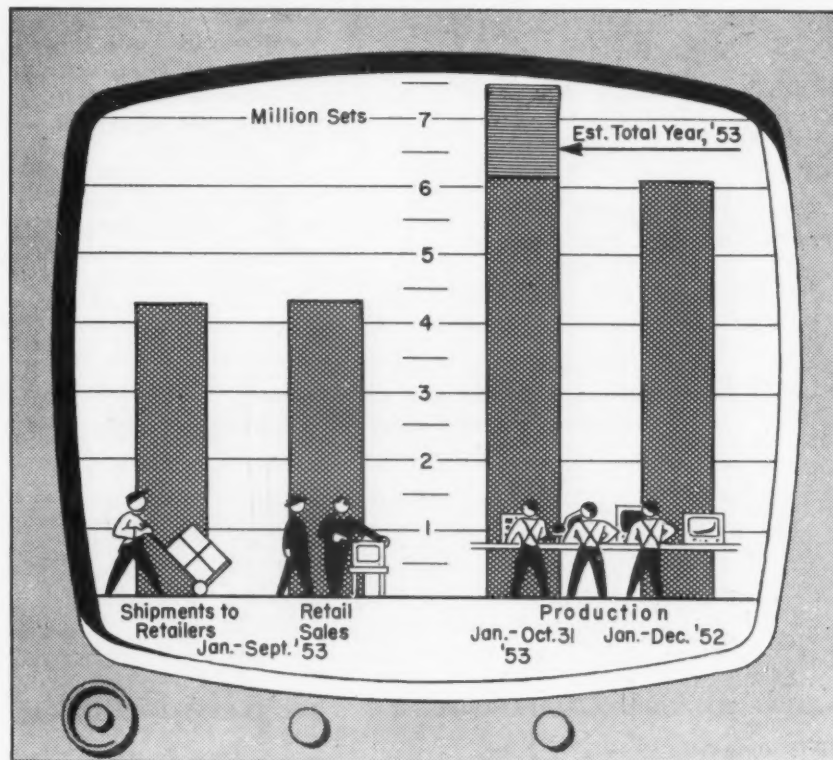
## No Deep Price Cuts

Querying manufacturers, IRON AGE could find no evidence that the industry is now prepared to flatten its price structure in the wake of Westinghouse. Cuts by Westinghouse ranged from 28 to 40 pct on six 21-in. screen models. Previously, some firms had made selective price cuts, even some increases. To stimulate dealer sales, companies have offered price "breaks" on some models, suggested lifting list prices on others.

With the hardening of competition Big Name producers are winning proportionately larger slices of the market.

Fiercer competition in 1954 may accentuate this trend. Even if they

## TV Shipments, Sales and Output



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## Marketing

come, price cuts will not be too drastic or widespread in the fourth quarter, but many in the industry believe the 1954 price trend will be down. How far down will be fixed by the field's limited ability to slash prices deeply. High costs are the obstructing factor.

Industry scapegoat for an anticipated easing of demand in the fourth quarter is color television discouraging purchases of black and white sets now. Public fear of obsolescence is depressing sales of big sets, those selling for \$300 and over, while the market for smaller models is generally flourishing.

### Price Obstacle

The industry has made no concerted public pitch to point out that even after FCC color system approval the first piddling trickle of color sets will not be on the market till the fall of 1954. From that point on, development of color TV as a substantial medium may not happen before 1956. High price of color sets (from \$700 to \$1000) will furnish a tall marketing obstacle.

As in the past the video market will be constantly freshened by new stations beaming into existence after FCC approval. Latest count of temporary authorizations to new stations was 200—with almost all operating. Next year another 250 stations may start transmitting and the sheer number of new markets may somewhat offset saturation of the lush metropolitan TV areas.

### Boosts Replacements

Each new station either opens up a new TV area or strengthens an old one. Addition of a second station often multiplies the TV sales rate.

Considering the industry's inventory plight, it will be difficult next year to surpass 1953's peak level production.

The industry is relying heavily on new markets evolving steadily while saturation markets build up their replacement sales potential. Whether demand eases slightly or not, video knows its future holds a widening forest of antennas.

## COAL: Lewis Starts Guessing Game

Miner chief puzzles industry by keeping mum on contract intentions . . . Low sales, high stockpiles blunt strike danger . . . Industry resistance strong—By J. B. Delaney.

The usual guessing game on John L. Lewis's coal contract intentions is in full swing.

Prevailing opinion is that the bushy-browed president of United Mine Workers is just biding his time. He can reopen contracts on 60 days notice but has given no sign that he intends to do so in the near future.

### What's The Delay

Why is he hesitating?

Coal marketing conditions would be one reason. Some mines are working only 2 days a week. The foreign market is shot. Price cutting is shaving already-thin profit margins.

Robust above-ground coal stockpiles also are making no contribution to Mr. Lewis's peace of mind. U. S. Bureau of Mines estimate is 77.9 million tons, equivalent to a 72-day supply. Some of the biggest holdings are in the hands of steel producers.

So Mr. Lewis has no immediate economic lever at hand to enforce demands for a pay increase or a boost in the royalty paid by the industry into his welfare fund. This royalty is now 40¢ per ton of coal mined.

### Strike Threat Less

Used to be that threat of a coal strike scared the daylights out of everybody. Steel mills particularly once were the mine workers unwilling but best friend by scurrying to shut down blast furnaces and curtail ingot production almost immediately after a mine walkout. But the mills got tired of being booby-trapped. They now keep a good supply of coal on hand around contract time, just in case.

The home consumer market is not what it once was either, due to the trend toward gas and oil for space heating. The railroads'

switch to diesels makes them less dependent on coal and less vulnerable to mine shutdowns.

### Industry Will Resist

Mr. Lewis also knows that the industry is confronted with relatively lean times for at least several more years due to the loss of once-formidable markets to oil and gas. Coal operators are optimistic over the long-term future but can see very little to cheer about at present.

Another pressure point on the mine workers is their apparent inability to make significant progress in organizing non-union mines. Mr. Lewis is constantly reminded of this by unionized operators pinched by competition from non-union mines which have no welfare fund contribution to worry about. This is a particularly telling advantage in today's soft market.

If and when Mr. Lewis makes his demands he probably will en-

### Who Pays for Strikes?

Effects of the late lamented steel strike on automotive costs are beginning to be totaled up as each automotive company rounds out its 1953 model year and begins on 1954.

Two weeks ago Nash turned in its report, stating that about \$12 million went into what the auto industry calls "excessive steel costs." Next to give his figure was L. L. Colbert, Chrysler president, who told a press conference that his corporation spent \$29 million for conversion and other premium steel prices.

It is apparent that the larger corporation paid more in total costs, but measured in terms of unit output, costs were much less on a relative basis.

## U. S. COAL PRODUCTION

Millions of Net Tons

1931	440
1932	360
1933	383
1934	417
1935	425
1936	494
1937	497
1938	395
1939	446
1940	512
1941	570
1942	643
1943	651
1944	683
1945	632
1946	594
1947	688
1948	657
1949	481
1950	560
1951	576
1952	465
1953	430*

\*Iron Age Estimate

counter the stiffest industry resistance in several years. The battle could well lead to a strike, although the UMW and the industry have settled their last several contract differences without a walk-out.

Those who are looking for a clue to Mr. Lewis's present frame of mind are pondering significance of his reprinting in the UMW journal the text of a recent speech by Joseph Pursglove, Jr., vice-president of Pittsburgh Consolidation Coal Co., on "The Future of Coal."

### Lean Years Ahead

Mr. Pursglove's speech took an optimistic view of coal's future, but warned that the industry is now experiencing a period of adjustment to shifting market conditions. He said that the change for the better will not come overnight, and indicated that meanwhile the industry faces vast expenditures of money for research and development "to achieve this growth potential and to promote new markets."

Some sources believe Mr. Lewis is attempting to condition his miners for the leaner years of the immediate future.

## Scrap:

### Steel operating changes signal decline in scrap demand.

Shutdown of 11 openhearth furnaces at the Vandergrift plant of U. S. Steel Corp. next fall will further reduce scrap consumption in the Pittsburgh district.

The Vandergrift shutdown will come about through the shifting of melting and slabbing operations from that plant to Clairton in a move to increase overall operating efficiency.

### Scrap Demand Will Shrink

A cold metal shop, the Vandergrift furnaces now consume 15,000 tons per month of purchased scrap, largely top grade material such as No. 1 bundles and railroad scrap. Annual ingot capacity of the furnaces is 480,000 tons.

The shift to Clairton will affect the scrap industry in two ways: (1) it will reduce overall scrap consumption, and (2) shrink district demand for the better grades of scrap. Availability of hot metal at Clairton makes possible the use of No. 2 heavy melting steel and No. 2 bundles in place of the premium-priced grades.

Some sources estimate that the shift will mean a reduction in

district scrap consumption of about 7500 tons per month—half of the present Vandergrift mill purchases. This would come about through the difference in scrap use due to availability of hot metal.

The Vandergrift development will be the second blow to scrap interests in the Pittsburgh district due to operating changes by U. S. Steel. Last March the company shut down its No. 3 openhearth shop at Homestead for safety reasons, and apparently has no intention of replacing this capacity. The shop produced over 1 million tons of steel per year and consumed approximately 300,000 tons of purchased scrap annually.

### Boost Hot Metal Use

Increases in the ratio of hot metal to scrap charges in openhearth furnaces of other producers in the area also have contributed to a more subdued outlook for the market.

Demand for dealer scrap in the Pittsburgh district is extremely dull. The mills are loaded with inventory, and the prospect of reduced melting operations has made them more cautious than ever in advance buying.

## Steel:

### U.S. Steel expanding into grain oriented silicon steel market.

When U. S. Steel Corp. completes an announced modernization program at its Vandergrift Works, it will become the third major producer of grain oriented silicon steel in the nation.

Other steps to increase efficiency of the silicon steel operation will mean eventual abandonment of 11 cold metal charge openhearth at Vandergrift. The furnaces, of nominal 70-ton capacity, have combined annual capacity of 480,000 tons. A slabbing mill also will be shut down.

Allegheny Ludlum Steel Corp. and Armco Steel Corp. have long monopolized the grain oriented silicon steel market. At the moment, U. S. Steel produces only a tiny fraction of this highly specialized grade, although the Vandergrift plant has been an important producer of other types of silicon.

### Will Raise Efficiency

U. S. Steel said it will step up production of grain oriented silicon sheets and coils. The program will also mean increased efficiency in producing other grades. The proportion of cold-rolled as compared to hot-rolled will be increased in step with demand.

Work will begin immediately, with completion scheduled for 1955. New equipment will include continuous annealing lines, box type electric and gas fired annealing furnaces, and auxiliary equipment. This is the second modernization program at Vandergrift. In 1947 a cold reduction mill and continuous annealing furnaces were installed to furnish electrical steel in coils.

The openhearth and slabbing mill at Vandergrift will be doomed with the shifting next fall of melting and slabbing operations to the Clairton Works, which practically adjoins the Irvin Works, where the slabs are converted into coils. Under the present arrangement, slabs are hauled 40 miles.



POLLUTION OF AIR being checked by Pittsburgh Steel Co. technicians. Firm has spent \$4.3 million in 3 years on equipment for cleaner air.

# AIR CONDITIONING: Tops \$1 Billion

Sales this year will top \$1 billion . . . But this is only the beginning . . . Five-fold expansion expected in next 10 years . . . Million room units this year—By R. M. Lorz.

Air conditioning salesmen are pacing back and forth in a billion-dollar reception room awaiting the arrival of the 72-Degree-Man. It isn't really a catch phrase. The comfort revolution is definitely on.

Informed sources expect the industry to rake in over \$5 billion annually within 10 years. This year combined sales of air conditioning and refrigeration equipment are expected to top \$1 billion. In a recent survey American Institute of Management predicted installation of year-round air conditioning in residential areas would climb from an estimated 50,000 units this year to 700,000 in 1958.

## Industrial Market Vast

Rose-colored statistical glasses are also being used in commercial and industrial fields. Sale of commercial or "window units" for year-round use is expected to increase in dollar value from \$600,000 in 1952 to \$2 billion in 1959. In 1947 less than 50,000 units were shipped. Today authorities know that over 1,000,000 will be shipped in 1953. That is about 3 times the number marketed last year. Saturation point is believed near 50 million.

Industrial market is so vast it is difficult to comprehend. Most manufacturers believe one-third of all the factories in the nation will have air conditioning by 1965.

A Chicago engineer summed up developments at the 8th Annual Refrigeration & Air Conditioning Exposition in Cleveland last week. His explanation of what happened: "We waited and worked for over 20 years and then—boom."

An army of common men caused the explosion in residential air conditioning. Contrary to popular opinion high sales figures are not being established in silk stocking

areas. In Chicago some salesmen estimate that 60 pct of the room air conditioners sold are going to families with incomes of \$6000 or less. Installment buying and the old American habit of keeping up with the Joneses has had its effect.

If it does, a growing number of suppliers will be chiefly responsible. Rapid developments in the field are keeping suppliers on the go. New room units in sizes ranging from ½ hp to 3 hp were legion at the exposition. Both small and large companies had glowing stories to tell.

Deering Air Conditioning of Cincinnati provides a good example. President Tom Deering told THE IRON AGE '53 sales had increased 1200 pct over last year's figures. "We expect to increase production by another 400 or 500 pct," he said.

Tremendous growth in the industry is mirrored in production figures of leading producers of room air conditioners. Fedders-Quigan Corp. of Buffalo made only

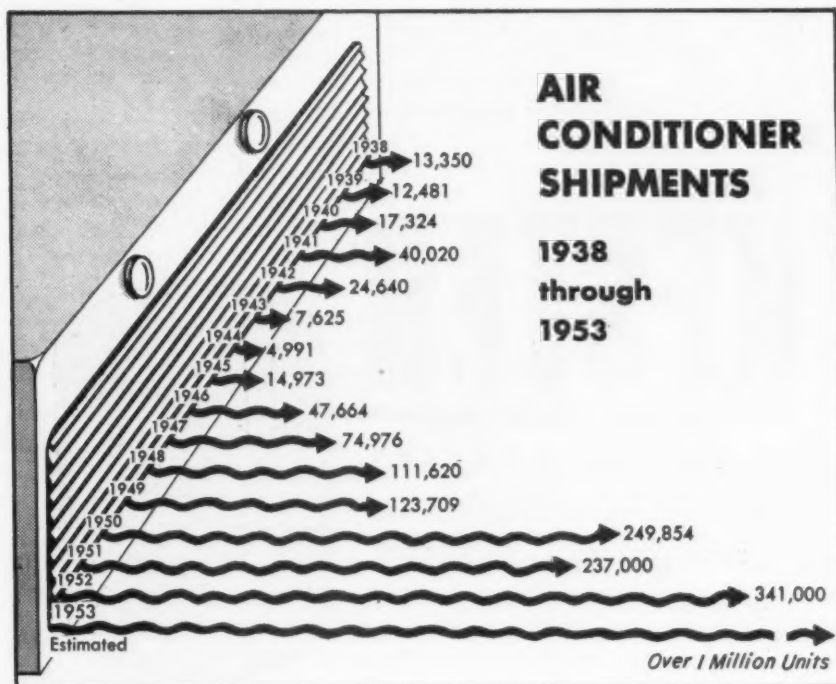
2000 units in 1948. By focusing most of its attention on the popular window units the firm should produce almost 300,000 units this year.

Giants in the appliance industry are moving with the tide. General Electric reports air conditioning sales up 200 pct for the first 9 months of '53; Westinghouse will soon launch a complete line of room air conditioners for the first time since the early '40s.

## Complete Units Popular

In the field of industrial air conditioning packaged units are setting the pace. Lower initial cost, reduced operating expenses, flexibility and local control all make the packaged unit attractive. Officials who recently started to market the Unarco line of industrial package units told THE IRON AGE they went into the new line to keep up with the trend. Components are still important but it looks as if sentiment for complete units is taking over.

Other developments expected to get more attention include smaller sizes of window type air conditioners; demand for air conditioning in labor contracts; use of lighter weight metals; design changes to reduce noise.





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## Fuel

### PIPE: The Pressure

Enough steel for 48,000 oil wells will be available ... New steel capacity helps.

Pinch for oil country goods may ease during 1954, according to a Republic Steel spokesman at the American Petroleum Institute meeting at Chicago last week.

Jay W. Owings, Republic Steel, estimated that 2 million tons of oil country goods will be shipped by steel producers during 1953. With additional capacity of 400,000 tons available for production during 1954, there should be enough steel for 48,000 wells. This, Mr. Owings indicated, should pretty well take care of current demand.

#### LP Producers Need More

Republic early this year brought in a new tube mill at Chicago, rated at 180,000 tons annually. Similarly, Colorado Fuel & Iron, Pueblo, Colo., and Lone Star Steel, Daingerfield, Texas, have brought in new mill capacity in the past year. Most of the new mills are not as yet operating at full capacity.

But oil companies who had been paying through the nose for foreign, premium-priced, and conversion pipe, are becoming extremely cost conscious. Expensive deals of the past few years are out. Consumers of oil country goods are shopping for the best price like other steel customers.

And they are directing inquiries to new pipe producers located closer to the oil fields, with an eye to possible freight savings. This may result in some future freight absorption on oil country goods.

Right now, however, steelmen are being pressured to get out all the steel they can. Pipe from 4 in. O.D. on up is in heavy demand, and pipe using plate skelp continues in strong demand as well.

#### Keep It Clean

At the same time, there are indications that the liquified petroleum gas industry will continue to take an increasing interest in pipeline transmission of its products.

Spokesmen for the Phillips Pipe

## Will Ease in '54

Line Co., reporting on the company's experience in piping butane and propane from Texas to St. Louis and then to Chicago, indicated that such transmission is possible with existing equipment. They predicted that the volume of butane and propane handled in this manner will increase in the near future. Phillips has been transporting butane and propane over a 950 mile pipeline from Borger, Texas, to East Chicago, Indiana, since mid-1952.

Main problem in moving butane and propane through conventional pipelines seems to be the pressure requirement. When pressure drops the butane and propane become a gas. Again, in transporting these liquefied gases, propane will dissolve and absorb any oily residue on the walls of the pipe left by products previously sent through the line.

### Use Buffer Slug

Phillips has managed to keep the propane clean by running a buffer "slug" of butane ahead of the propane load, and the butane if contaminated is fractionated at the end of the run.

As an indication of the amount of this traffic, a single propane load may run to 55,000 bbl and can be taken into the system at a 60,000 bbl per day rate.



"Remember that customer I was telling you was eating out of my hand..."



## CLARK UTILITRUCKS handle the toughest jobs at least cost!

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### 2. Easier to service

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engine; one-piece floorboard lifts up to expose master cylinder and transmission; swing-out battery. All service points easy to reach.

### 3. Built to take punishment

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\*Special stevedoring model available

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# STEEL: Alloys Will Save Nickel

**Battelle Institute takes wraps off iron-base alloy containing no nickel . . . Yet chromium, manganese, copper provide good physical properties for some uses.**

Researchers at Battelle Memorial Institute, Columbus, Ohio, have developed an iron-base alloy which gives promise of saving significant amounts of scarce nickel—vital in so many products of defense and civilian industry.

The nickel-free, high-strength steel wire may be substituted for nickel-stainless steel in applications requiring good workability, moderate corrosion resistance, relatively low electrical conductivity, and nonmagnetic properties.

## Will Conserve Nickel

Scarce nickel previously required for such applications may now be freed for other uses.

In a paper presented before the Wire Assn. meeting in Chicago last week H. O. McIntire and G. K. Manning of Battelle reported results of their development work on the new alloy.

Drawn into wire, one mixture of the alloy had a tensile strength of 292,500 psi; 0 magnetism; and a ductility rating of 315°. Another variety, drawn into the same .015 in. diam wire was rated at a tensile strength of 300,000 psi—and again, contained no nickel.

## Properties Look Good

Work began at Battelle on the nickel-free austenitic steel for high strength wire when the Army Signal Corps indicated need for a high strength wire to go into Spiral-four cable. The cable contains a sixteen strand braid of cold-drawn type 302 or 304 stainless steel wire to give strength. The problem: Evolve a wire that would use less chrome and nickel, yet would have the strength, flexibility, magnetic, and electrical properties of the original.

A number of alloys were developed. Beyond the laboratory testing stage, a 225 lb melt of one alloy went through a commercial wire

mill and was processed using the mill's standard procedure for 302 or 304 stainless. With a 93 pct reduction in area the wire achieved a 300,000 psi tensile strength. The melt analysis: 0.10 carbon; 10.7 chromium; 16.0 manganese; 0.9 silicon; 2.0 copper; 0.15 nitrogen. Nitrogen was added as high-nitrogen ferrochromium.

From another lot, Spiral-four cable has been made and the finished product passed tests. Analysis of the melt was 0.06 carbon; 12.9 chromium; 16.2 manganese; and 0.3 silicon.

## Which Ones Work?

McIntire and Manning indicate that percentage ranges as follows may be used satisfactorily in the alloys, though they indicate that further developmental work is in order: 0.3 to 1.3 silicon; 0.8 to .15 carbon; 9.0 to 11.0 chromium; 14.5 to 18.5 manganese; and 1.8 to 2.2 copper; 0.08 to .15 nitrogen.

Copper seemed to improve drawing quality in amounts up to 2 pct when used with the low-carbon chromium-manganese-iron alloys, as this test group was designated.



"One thing sure,—that metal's not been hardened properly."

# Costs:

**Efficiency program covers 32 projects for better output.**

Some firms are due for a painful awakening in the next couple of years. They'll be the ones who have lulled themselves with the "business as usual," "we've done it this way for a long time" psychology. Return to a buyers' market will be painful for them.

Fortunately for the economy, most firms, large and small, won't have to learn the hard way. The majority have been overhauling their operations, checking cost cutting and product improvement possibilities for some time. Lyon Metal Products, with plants in Aurora, Ill., and York, Pa., is a good case in point.

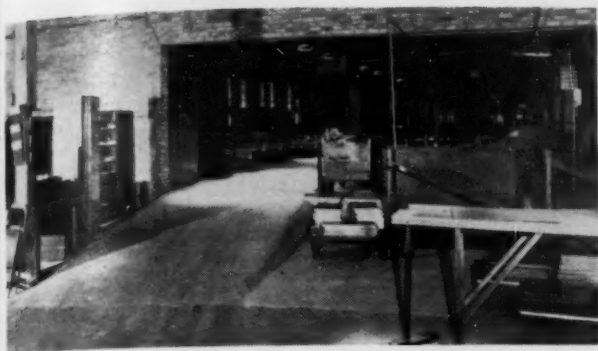
Lyon started early in 1950 to overhaul its operation, set up a committee of management personnel to study carefully the whole manufacturing setup. By July 1951 the group had decided on 32 specific areas of action, appointed special committees to work on them.

Modernization to date has cost \$1,250,000. Highlights included complete updating of plant facilities and manufacturing techniques, a survey of 294 products, with subsequent redesign of many of them, substantial cost cutting and improvement in packaging.

A special feature was shifting to the use of coil steel. This item took a cool \$300,000, but Lyon feels it was well worth it. Company executives believe theirs is the first firm in the metal furniture industry to make this shift.

New layout should save \$600,000 this year at the Aurora plant alone. Planning was done entirely by company personnel, who are rightfully proud that no production time whatsoever was lost during modernization.

## Management



CLUTTERED, INEFFICIENT, poorly lit area on left has been streamlined by painting, removal of partition, better spotting of equipment.



RELOCATION of box assembly (left) closer to shipping area has freed floor for machinery (right) in direct line between shears and finishing.



REMOVAL of partition gives better materials flow. Shifting of tool room allowed general welding and assembly before finishing area.



TRUCKING has been reduced by up to 300 ft by relocating for direct production flow. Painting, steel sash, better lighting boost output.

## CHEMICALS: Sales Dip for Producers

**Chemicals manufacturers believe sales may slow next year . . . Would be first decline since late '30's . . . Industry suppliers see continued expansion—By K. W. Bennett.**

For the chemical industry, 1953 will be a year to be remembered. Manufacturers' sales of chemicals averaged \$405 million per month in 1940. By 1950 this figure had risen to \$1,334,000,000 a month, and through August of this year the average was \$1,678,000,000. Sales forces are confident that the year's end will find them well ahead of the 1952 figure.

To suppliers of the chemical industry, the rising chemical output has meant a steadily increasing demand for valves, pipes, tubes, tanks, and instruments, as chemical producers swung into postwar expansion programs in 1945.

### Expect Drop

There are indications now, however, that there will be a slight drop in chemical sales in 1954. Sales executives are warning their forces that 1954 will be a tough competitive year. That each profit penny will be squeezed tight between rising costs and stiffly competitive prices.

Salesmen in the field agree, believing that, despite the annual rise in industrial chemical sales since the late 1930's, next year will see the sales curve holding at the 1953 level, or dropping slightly. Highest estimate on the possible drop in sales was 7 pct.

Decrease in chemicals sales will not hurt the chemical industry's suppliers too much, however. The industry's expansion program that began in 1945 is not over. One producer will spend the same substantial amount on plant expansion in 1954 that it did this year.

Another smaller company is in the midst of a \$13 million program that has thus far boosted output twice, will have boosted it fourfold when the program winds up in mid-1955. A third large producer will begin a major plant expansion soon.

As one sales head put it, "I figure in 1954 we'll do less overall than we did in 1953, maybe at the 1951 level. (For his firm, a good year.) But that's not the end of it. We've some new products that are just beginning to gain momentum. They could change our sales picture, and considerably."

New products mean new plant equipment, and a number of new chemicals and chemical products look good from a sales standpoint.

Polyethylene, the product used in the bottles that squeeze, as well as in large industrial carboys, is going up. One new plant aimed to produce for this market is already on the way.

Isocyanates, used to produce a tough, resilient foam, show promise; can be used to give structural strength with lightness, and have been talked of for insulating.

Petroleum industry is interested in using chemicals to pep up tired oil wells. Antistatic agents, new dyes, are expected to move more

strongly. Though the ammunition cutback in shell production is already here, the government cut very heavily into its reserve powder supplies, will probably keep powder production at a good level into 1954, which means a going demand for nitric acid, toluene, cellulose, sulfuric acids, and alcohol.

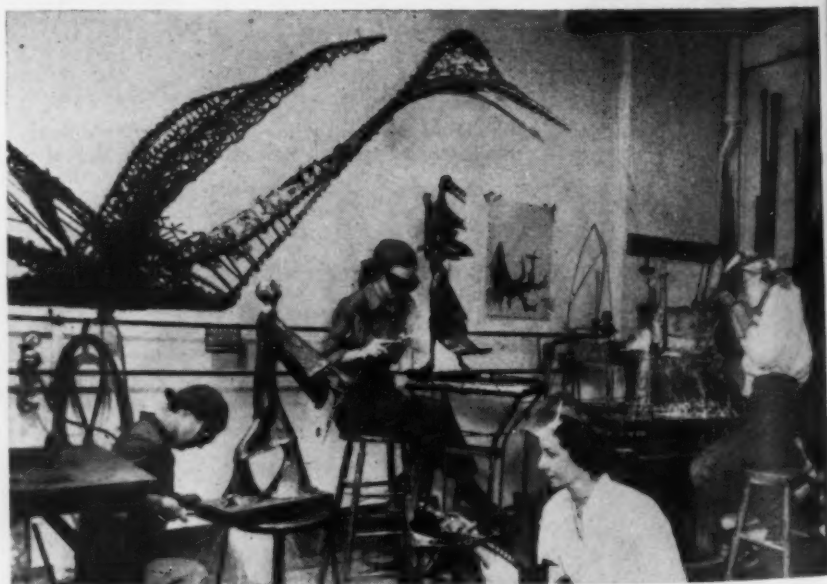
Glycerol capacity may also be due for an increase. Polyesters for use in glass, fiber-reinforced plastics look good; synthetic alcohol plants are a possible for expansion; and a changing pattern in ethylene production will see new plants built for this purpose in petroleum refinery areas.

Liquid ammonia fertilizers were gaining strength in 1953, and Dept. of Agriculture calculates that 165,000 tons of steel plate will have gone into tanks to hold ammonia for agricultural use during 1953, predicts 220,000 tons of plate will be used in 1954.

Another good bet that could call for increased capacity are plasticizers. In 1951, 65 million lb of this material were used. In 1952 the figure reached 266 million lb. Use is expected to grow.

For the chemical industry, 1954 may be slightly slower, but for the builders of equipment chemical producers use, it looks fine.

## Welding



WELDING SPARKS fly as women sculptors tack together iron, steel pieces at Sculpture Center in New York. Creature at upper left is called "Water Bird."

# New Handling System Speeds Production of Grinnell Fittings

Grinnell Company switched from old trucks to dependable Lewis-Shepard SpaceMaster Model "E" Electric Trucks, and a tough problem handling small castings coming out of the foundry.

Before SpaceMasters . . .



These space-eating, non-stacking shop barrels caught castings at end of foundry conveyor. Man with 2-wheeled hand truck dragged full barrel to a grinding machine. Machine operator, according to a Grinnell engineer, "... worked with one arm and his head in the barrel, his other arm in the machine."

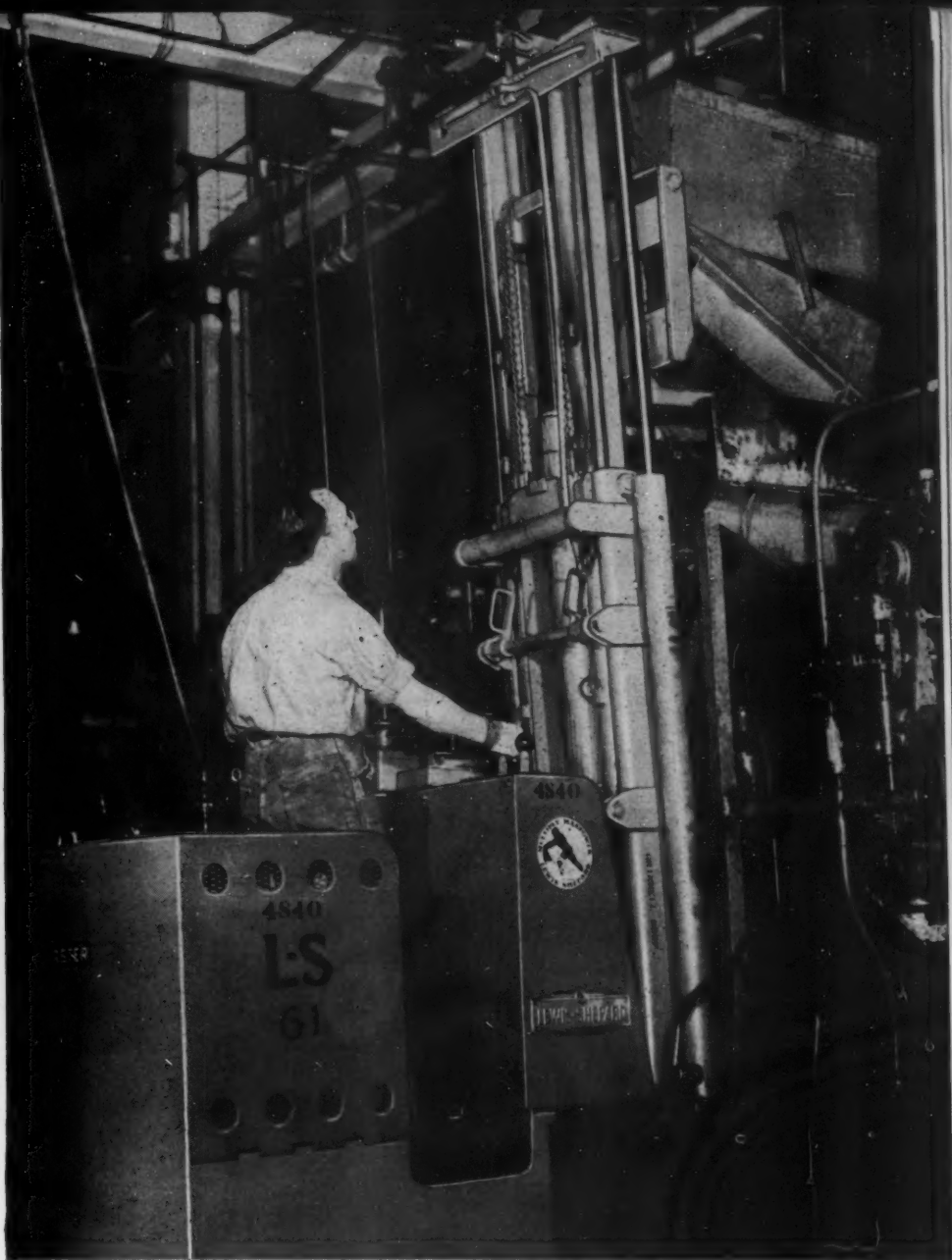
After SpaceMasters . . .



Drop-bottom boxes catch castings from foundry conveyor. Lewis-Shepard Model "E" picks up box, carries it to a grinding machine, lifts it above feed hopper and dumps castings. Boxes can be stacked, stored efficiently.

About this Truck . . .

Lewis-Shepard's Standrive design permits easy trailing of load — operator has full, easy visibility to rear. Center control gives operator all round protection, permits him to get on and off quicker. Capacities to 1000 lbs.



Lewis-Shepard SpaceMaster Electric Fork Truck lifts drop-bottom box to dump castings into feed hopper at a tapping machine.

The results at Grinnell, where manhandling was eliminated, storage efficiency improved and costs lowered, can point the way to greater efficiency for you. For full information regarding the cost-saving materials handling equipment from Lewis-Shepard, call your local L-S Representative or mail the coupon today.



The MASTER Line

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Grocery Chain	73 L-S in use — reordered 6
Chemical	14 L-S in use — reordered 5
Elec. Goods	194 L-S in use — reordered 14
Carbon Mfr.	23 L-S in use — reordered 4
Mfg. Chemicals	74 L-S in use — reordered 6
Glass Mfr.	12 L-S in use — reordered 12
Rubber Goods	5 L-S in use — reordered 5



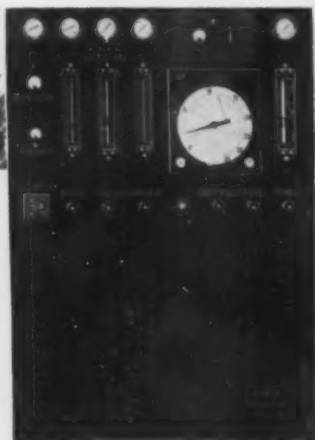
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## HEAT TREATING OF STAINLESS STEEL



## NITRONEAL GAS GENERATOR

... Produces pure nitrogen with a controllable hydrogen content that can be varied at will and maintained at any percentage from .25% to 25% to best suit work in furnace.

Used for bright annealing, heat treating, and furnace brazing of stainless steel, low and high carbon steels and non-ferrous metals.

- Fully Automatic
- No Operating Personnel Required
- No Explosion Hazard
- 30% Less Costly than Dissociated Ammonia.

Units available in 100 C.F.H. to 10,000 C.F.H. capacities.

Write for Booklet No. 21

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## Industrial Briefs

**New England Plant . . . WESTINGHOUSE ELECTRIC CO.** will spend more than \$4 million at its Appliance Div. plant in Springfield, Mass., as its first step in an extensive expansion program.

**It's Agreed . . . THE SHEFFIELD CORP.,** Dayton, will design, manufacture and market Cavitron machine tools, according to a joint announcement by the Cavitron Corp., Long Island City, N. Y., and Sheffield.

**New Arm . . . BAKER-RAULAND CO.** has appointed St. Louis Railway Supply Co. as distributor of industrial trucks and cranes to railroads in the St. Louis area.

**Combines Forces . . . FIRTH STERLING, INC.,** has established a new office at 200 North Ave., Westfield, N. J., combining the Philadelphia and New York offices at one headquarters.

**Helping Hand . . . DENISON CO.** has established a scholarship award plan to "foster interest in the rapidly expanding field of industrial hydraulics." It will be awarded annually to one or more graduates of Franklin County, Columbus, Ohio, high schools. A second award may go to a graduating student with a parent in the employ of the company.

**Site Selected . . . MONSANTO CHEMICAL CO.** has selected Texas City, Tex., as the site for its first polyethylene production plant.

**Amarillo Branch . . . THE FOXBORO CO.,** Foxboro, Mass., has opened a branch office in Amarillo, Tex., at 1117 La Paloma St. D. T. McElligott is industrial engineer of the new office.

**Exclusive Basis . . . COPPERWELD STEEL CO.** has appointed Brace-Mueller-Huntley, Inc., Mill Sales Div., exclusive mill sales representatives in New York State and Northern Pennsylvania.

**Hear Ye . . . PURCHASING AGENTS ASSN.** of Pittsburgh met this week at the University Club, Pittsburgh. Vincent deP. Goubeau, vice-president and director of materials of Radio Corp. of America, addressed the meeting on "Standardization."

**Company Purchased . . . KOPPERS CO., INC.,** Pittsburgh, has purchased the business of American Ore Reclamation Co., Chicago.

**Leasing Plan . . . CLARK EQUIPMENT CO.,** Buchanan, Mich., has established a low-cost equipment-leasing program to operate through its dealers on a national basis.

**New Corporation . . . AIRCONIUM CORP. OF AMERICA** has been formed. It plans to manufacture various zirconium compounds, but will concentrate on production of zirconium oxide.

**Expanding . . . KROPP FORGE CO.,** Chicago, has begun a \$5,500,000 improvement and expansion program which will enable them to produce larger and more complex forgings for Army aircraft parts.

**Distributor . . . KURT ORBAN CO., INC.,** New York, has appointed the International Machinery Co., New Haven, Conn., as sole distributor of its line of German precision machine tools in Southern New England.

**Gets Contract . . . DRAVO CORP.,** Pittsburgh, has been awarded a package contract to furnish and erect complete facilities for new boilers and turbo-blowers, two 12-gross ton ore bridges and a new river dock, by McLouth Steel Corp., Trenton, Mich.

**Formed . . . International Rubber & Plastic Co.,** a division of LEFTON IRON & METAL CO., St. Louis, has been formed, at 521-23 Spruce St. They will handle all types of plastic scrap as well as certain types of rubber scrap, such as foam and rubber compounds.

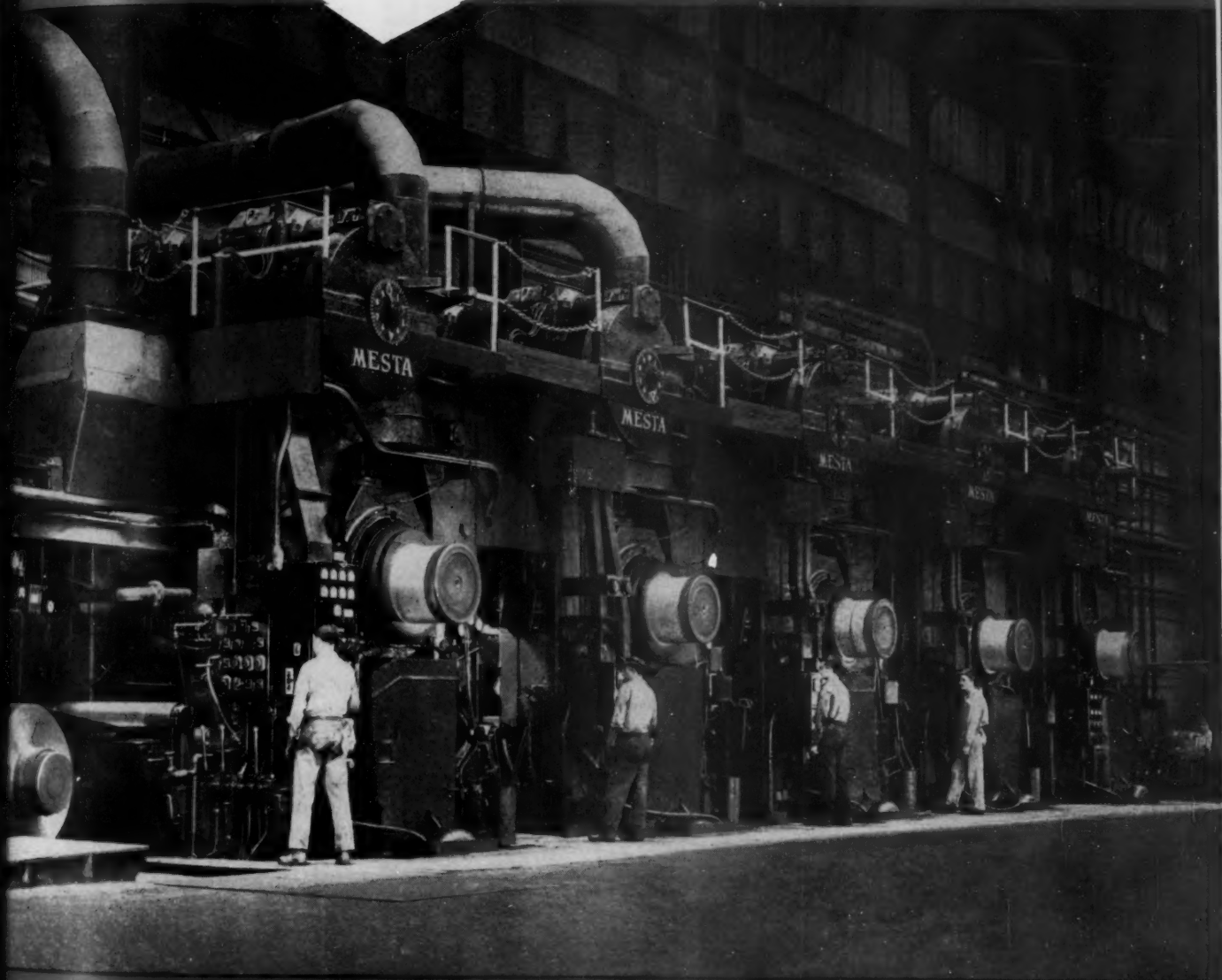
**New Headquarters . . . WESSON METAL CORP.,** Lexington, Ky., has opened a new branch office at 18353 W. McNichols, Detroit. Roy Gorman, will be in charge.

**Re-Elected . . . Col. Willard F. Rockwell,** chairman of the board, ROCKWELL MFG. CO., Pittsburgh, was one of four Pittsburgh industrialists re-elected to the National Industrial Conference Board for a 1 year term.

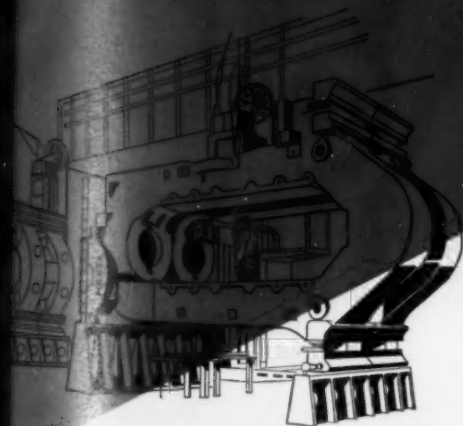
**Breaking Records . . . INLAND STEEL CO.** reports that a record tonnage of raw materials will have been carried to its docks at Indiana Harbor, Ind. at the end of the 1953 shipping season by Great Lakes freighters.

# MESTA

**HIGH-SPEED  
COLD MILLS**



MESTA 56" FOUR-HIGH, FIVE-STAND HIGH-SPEED  
TANDEM COLD MILL INSTALLED IN A LARGE  
EASTERN STEEL PLANT.



SIMULTANEOUSLY MACHINING  
ROLLING MILL HOUSINGS IN PAIRS ON  
MESTA HEAVY DUTY DRAW-CUT SHAPERS

*Designers and Builders of Complete Steel Plants*  
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# The Automotive Assembly Line



## Will GM Break Willow Run Jinx?

**Detroit expects new owners will make huge plant profitable . . . Emergency forced purchase . . . GM's bid high by \$3.7 million . . . Kaiser had wanted \$37 million—By R. D. Raddant.**

Will the giant Willow Run throw off the stigma of an industrial white elephant now that it is in the hands of General Motors?

Probably no other single manufacturing facility in the world has aroused as much controversy as has this 3.5-million-sq-ft plant, the largest under a single roof. Like many other war heroes, it made a great contribution to the war effort but had trouble adjusting to civilian life.

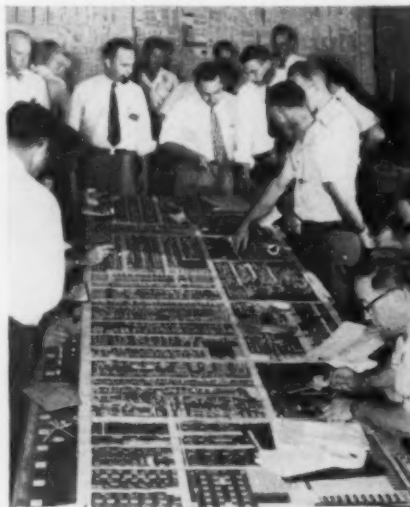
**Fire Forced Purchase . . .** It's extremely doubtful, however, if General Motors would have bid on the massive plant had not the Detroit Transmission fire forced it to seek emergency quarters for Hydra-Matic production. After leasing about 1.5 million sq ft of floor space, bidding on the entire structure was a matter of economics when Kaiser sought to dispose of Willow Run on the basis of competitive bids.

That several other firms bid on the sprawling facilities indicates that Willow Run was not entirely unwanted, even though GM's price, \$26 million, was \$3.7 million over the next highest. THE IRON AGE has reliably learned that Kaiser at first wanted \$37 million, almost the whole amount owed by Kaiser to the government. At this time, it isn't known who were the other

bidders but no doubt their names will filter through in a short time.

**Out of Market . . .** The purchase by GM has many facets, many of them purely local in nature. Probably the most significant is that it virtually marks the end of Henry J. Kaiser's attempt to crash the auto market.

Of course, Kaiser is still in the auto business, but except for some incidental operations the setup is practically the same as Willys-Overland which Kaiser purchased earlier this year. Edgar Kaiser still heads Kaiser Motors, but the manufacturing operations are run



GM ENGINEERS work out plans on utilization of Willow Run's vast facilities.

by Willys men and manned by Willys employees in Willys plants.

The \$26 million did not go to Kaiser for working capital, but to the RFC to reduce Kaiser's \$41 million indebtedness.

**Make It Work . . .** It is now up to GM to make Willow Run work. Few persons in the automotive world doubt that GM can. Willow Run is said to have many disadvantages for manufacturing anything but airplanes, but it is a modern plant and no doubt can be made to pay off. GM would never have constructed a plant in the dimensions of Willow Run, but at the bargain price and a time of necessity, it can certainly afford to make the adjustments that might be necessary.

Historically, Willow Run has had its ups and downs. It was started in 1941 by the late Henry Ford who promised to turn out a bomber in a year and reach the rate of one an hour. This he did, reaching the rate of 1 bomber in 55 minutes at the peak of production with about 40,000 workers.

**Didn't Want It . . .** But Ford declined to bid on the plant, which was built at a cost of \$100 million, stating that it was unfit for auto production. However, that was long before the new expansion and decentralization program launched by Henry Ford II and it is just possible that Ford was a bidder in the last sale.

Kaiser-Frazer leased the plant from the RFC in 1945 on a 5-year lease, but bought the plant Dec. 31, 1948, for \$15.1 million. In 1951 Kaiser augmented its lagging auto production with the assembly of cargo planes, but this contract was cancelled in June of this year when costs were termed excessive by the Air-Force.

**Add Other Operations . . .** Shortly thereafter Kaiser ceased production of cars on June 26 and

only resumed production of some Henry J's a few days ago on a limited basis.

The history of GM's leasing of floor space after the Detroit Transmission fire is now well known. Willow Run will now be the permanent home of Hydra-Matic production and other manufacturing operations will no doubt be added to make the best possible use of Willow Run's vast floor acreage.

Note to labor: When Willow Run was picketed once, it took a line about 16 miles long to surround it.

## Transmissions:

### Chrysler PowerFlite has fewer parts, high drive torque.

Chrysler engineers admit a little shamefacedly that their new PowerFlite transmission ought to be the best in the industry. After all, as the last company to introduce an automatic transmission, it could profit by all the mistakes of the rest of the industry.

Whether this thesis is actually true is a question that isn't going to be answered here. Nevertheless, differences and modifications put into PowerFlite as compared with other tested transmissions should be noted.

#### Uses Fewest Parts

To begin with, the PowerFlite is a torque converter combined with a two-speed planetary transmission. This is similar in principle to all other automatic transmissions except GM's Hydra-Matic, which has an automatic four-speed gear box without a converter. Buick's Dynaflo has the usual sets of gears, but they are designed to function at an infinite number of ratios with the driving range constantly selected.

A primary concern in designing any transmission is size, weight and complexity. Fighting these factors is especially noticeable in the PowerFlite, now the lightest automatic transmission.

In performance, its 4.47 torque multiplication ratio is the highest

in the industry. It is derived from the high torque converter starting ratio, 2.61, multiplied by the 1.71 starting gear ratio supplied by the planetary transmission.

#### Skip Low Gear

It is interesting to note here that although PowerFlite has a low position on the selector lever, the L does not mean a lower gear more powerful than the drive position.

What the L position does is to lock out the automatic upshift. This implies that Chrysler has confidence that the new engines have the power to pull cars in any heavy going that might be encountered.

Another difference in PowerFlite is the absence of a park position. (THE IRON AGE, Oct. 1, 1953, p. 54.) This is traceable to the fact that Chrysler has an unusually effective hand brake, an item that has deteriorated in most cars in recent years and actually disappeared from some models.

Most drivers of standard transmission cars became accustomed to slapping their cars into

### Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CAR	TRUCKS
Nov. 14, 1953..	96,849*	18,825*
Nov. 7, 1953..	120,377	13,406
Nov. 15, 1952..	114,020	32,805
Nov. 8, 1952..	111,845	31,765

\*Estimated: Source Ward's Reports

gear when parked on an incline, instead of relying on the parking brake. This was impossible in fluid drive or torque converter transmissions. As a result, a pawl is used in most transmissions, locking the drive shaft in the park position. In Hydra-Matic, reverse can be used for parking, since gears are actually locked.

Chrysler chose to rely on an internal expanding mechanical brake that is separate from the other braking system.

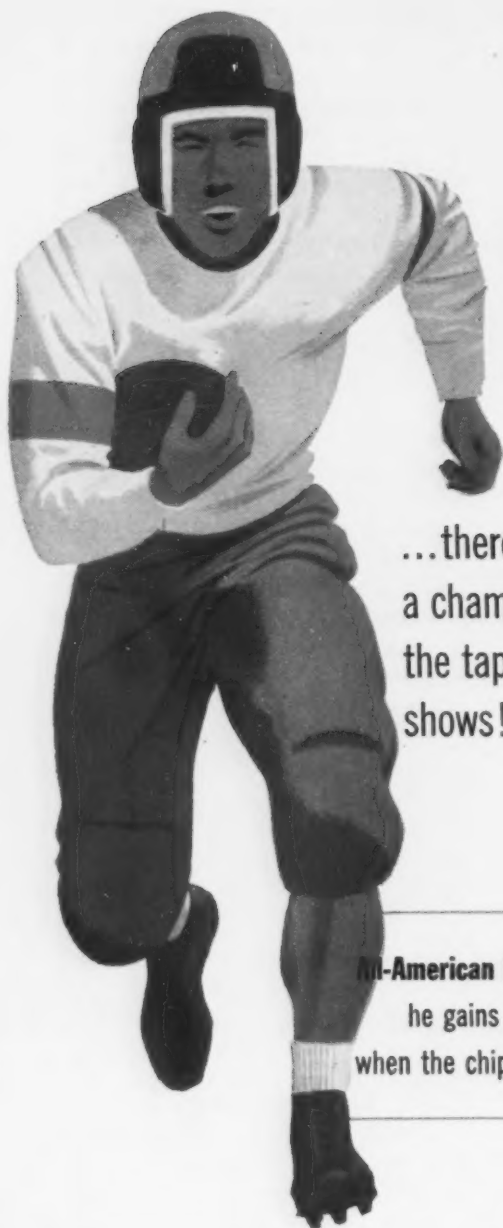
A direct drive feature of the Studebaker and Packard transmissions was also bypassed by Chrysler. This also avoided weight and cost, but Chrysler engineers contend its absence provides a more flexible performance.

## THE BULL OF THE WOODS

By J. R. Williams



# IT'S PERFORMANCE THAT COUNTS



...there's more to a champion than the tape measure shows!

**All-American Halfback...**  
he gains ground when the chips are down.



**Average Halfback...**  
he may measure the same... but he's stopped in the tough ones.

## **HARDTEM DIE BLOCKS\*** perform like "champions" in your production line!

Heppenstall Hardtem Die Blocks perform like "champions" because they possess those extras that result in superior quality. Their patented steel analysis

resists softening and heat checking in service. Records from plants using Hardtem Die Blocks provide the following benefits for production:

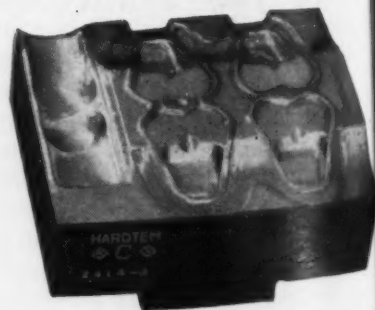
- ★ Longer Production Runs
- ★ Long Life of Dies
- ★ Lower Overall Die Cost
- ★ Less Down Time
- ★ Holding of True Dimensions

It will pay you to try Hardtem Die Blocks. Call Heppenstall Company, Pittsburgh 1, Pa. Sales offices in principal cities.



### Heppenstall

*The most dependable name in die blocks*



## This Week in Washington

### May Get Manufacturing Census In '54

**Federal census of manufactures would aid industry's market analysts . . . Battle looms over manufacturers' tax in next session . . . See individual merit tariffs—By G. H. Baker.**

Brighter prospect for a federal census of manufactures next year will cheer industry's market analysts.

U. S. Census Bureau had planned to conduct its regular censuses of manufactures and transportation this year, but an economy-minded Congress withheld the necessary funds.

Secretary of Commerce Sinclair Weeks, now thoroughly impressed with the importance to industry planners of census data, is preparing to ask Congress early next year for a supplemental appropriation to his regular budget in order that work on the manufacturing and transportation censuses may be started as soon as possible.

**Helps Chart Action . . .** Funds for the two censuses were eliminated by Senate-House conferees last year in favor of a token appropriation (\$1.5 million) for spot checks of manufacturing data. Earlier, the Senate had approved the proposed expenditure of \$9.4 million for carrying out the censuses in full. Secretary Weeks' Business Advisory Council had asked Congress to appropriate \$11.5 million while pointing out that dropping of the censuses would work "extreme hardships" on firms that rely on the reports in charting the course of business.

**Expect Early Tax Pitch . . .** If Secretary of the Treasury Humphrey goes ahead with his present plans to ask Congress for a national manufacturers' tax, he will not lack support in Congress. Several influential members on both the Senate and House sides of the Capitol are now writing leg-

islation calling for establishment of a manufacturers' tax. They expect to drop these bills into the legislative hopper soon after Congress reconvenes early in January.

Typical of the several bills now in preparation at the Capitol is that of Rep. Noah Mason, R., Ill. Mr. Mason believes a national manufacturers' tax is the logical answer to selective taxes.

**See Stiff Opposition . . .** Mr. Mason's bill calls for raising of about \$5 billion annually through a flat 5 pct levy on all manufactured goods and elimination of nearly all existing excises—except those on tobacco and liquor. In addition, double taxation of corporate dividends would be ended, and a ceiling would be placed on the extent to which both corporate and individual incomes could be taxed.

Politically speaking, however,

#### Recognize Red China?

Hints of a possible change in U. S. policy to Red China came last week from C. B. Thomas, Chrysler vice-president and president of Chrysler Export Div.

Mr. Thomas said that State and Commerce Depts. have been surveying industry on the possibility of opening up trade with Communist China. He pointed out that transportation is one of China's biggest needs and would provide a good export market, especially for trucks.

Government spokesmen told THE IRON AGE that the entire question of trade with China has been under study since the embargo was started, but that there is still no sign of lifting restrictions.

Congress as a whole seems ill-disposed to adopt the Mason proposal or anything like it. Opposition to a manufacturers' tax is not as strong as that against a retail sales tax, but consumer and labor groups are exerting strong pressure upon individual congressmen to reject both tax plans. Some congressmen feel that if any new or higher taxes are voted at all next year, they will be in the nature of selected excises on products not now taxed.

**Sets No Policy Line . . .** It's far too early to tell what President Eisenhower's "policy" on tariffs is, but his refusal last week to approve higher duties on imported briar pipes definitely does not mean that he intends to veto all future bids for protective duties.

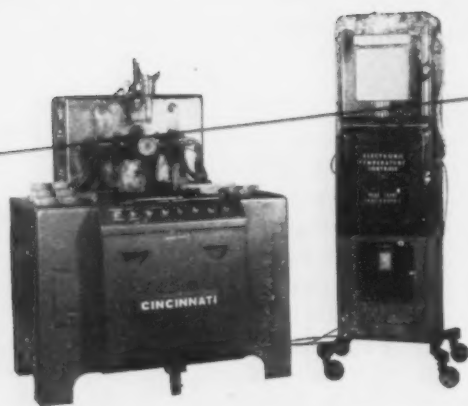
In rejecting a U. S. Tariff Commission recommendation for sharply-increased duties on imported briars, Mr. Eisenhower expressed his view that the woes of the domestic industry are due to a trend away from pipe-smoking, and not to competition.

**Bigger Questions Coming . . .** Sooner or later, the White House will face—and settle—some vital tariff questions involving products of far greater importance to the domestic economy than briar pipes. The current rates of duty on lead and zinc imports, for example, are now the subject of a penetrating Tariff Commission investigation. Western mine operators have ample—and painful—evidence that their rates of lead and zinc production have dropped sharply, while imported lead and zinc are enjoying healthy markets in this country.

Mr. Eisenhower went on record earlier this year as stating that a strong domestic mining industry "is vital to national security and to the continued prosperity of our country." Some congressmen wonder if the White House could possibly justify a refusal to increase

## yesterday

It's a far cry from the working model of the early Cincinnati Flamatic hardening machine shown at left to the "do-the-impossible" machines being run off today in the Flamatic Heat Engineering Laboratory. While the early machine hardened small gears in actual production and (among other things) helped to break a critical bottleneck in production of automatic 90 mm. gun loaders . . .

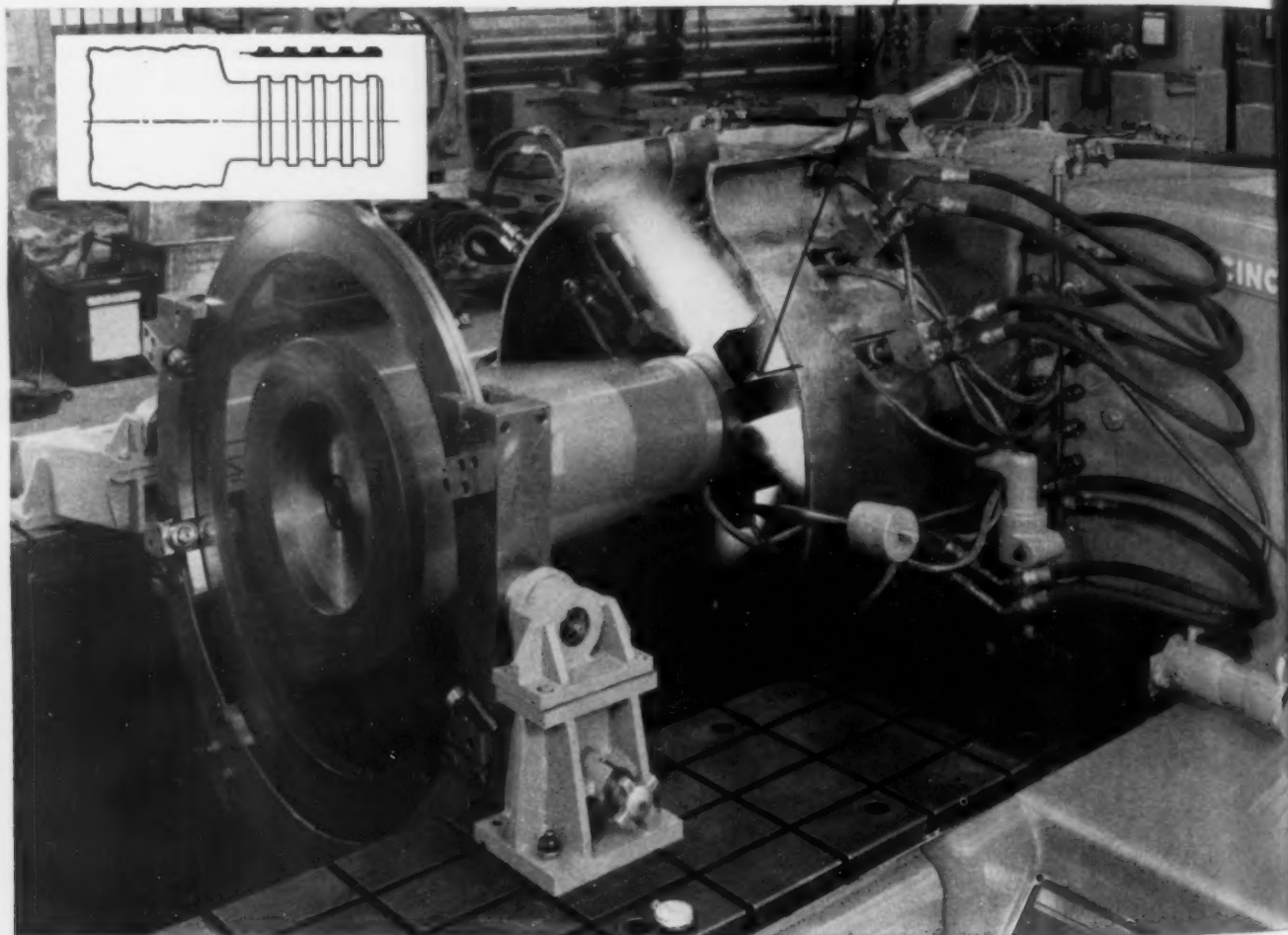


# what's new

## in flamatic selective surface hardening

## today

. . . one of Cincinnati's latest Flamatics (below) is hardening ball retention raceways in the assemblies for mounting propeller blades to go on aircraft we can't talk about. Races must be surface hardened to rigid specifications, before bearings are installed in the large assemblies. The work holding fixture by itself is quite a masterpiece. While Flamatics are getting bigger and more versatile, the original principles still apply: concentrate heat, control temperatures and confine hardness.



Flamatic's new modern heat engineering lab can handle your heat treat problems from development right through to production. Write for Catalog M-1724.

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## THE CINCINNATI MILLING MACHINE

Cincinnati 9, Ohio, U.S.A. •



lead and zinc duties in the face of this clear-cut statement.

**To Weigh on Merits . . .** Probable course of action to be followed by the White House in arriving at future tariff decisions is to weigh each case on its own merits, not pursue either a "high tariff" or a "low tariff" line of reasoning.

**Speed Service, Lower Costs . . .** Faster service is being rendered labor, management, and the public with a lower cost to the taxpayer as a result of trimming its legal staff, the U. S. Labor Dept. says.

As a result of budget cuts, some 45 lawyers have been dropped, including 4 assistant solicitors from the previous staff of 8 attached to the solicitor's office.

In a report to Secretary James Mitchell, Solicitor Stuart Rothman says that with fewer employees his office had accomplished over the past 3 months:

Trimmed the backlog of wage rate determinations for government construction work under the Davis-Bacon Act (pending 21 days or longer) from 357 to 58;

Reduced the number of violations waiting disposition (pending for as much as 4 months) from 145 to 58;

Put into effect a new enforcement policy for speeding up work, based on decentralization of responsibility to field offices.

## Kill Spoon River Atom Plant

Atomic Energy Commission cancelled plans for its projected \$26 million Spoon River (Ill.) plant because recent technical developments now permit increased output of the products involved at existing AEC plants.

AEC declines to say what "products" it had planned for production at the Spoon River plant.

In addition to the \$26 million saved by cancelling construction plans, AEC estimates it will save another \$4 million that would have been involved in startup costs, plus about \$3 million a year in recurring operating expenses.

Payment for work already ac-

complished and for termination of contracts totals about \$2 million. Terminating negotiations with the AEC are Fluor Corp., Ltd., of Los Angeles, the architect-engineer, and Thompson Products, Inc., the operating contractor.

## Steel:

### State Dept. protests export price fixing by Steel Pool.

U. S. State Dept. has informally protested the agreement of steel exporters of the European Coal & Steel Community to fix export prices. The protest was not made officially, but State Dept. has made known its displeasure through normal diplomatic channels.

Although it tactfully denies definite knowledge that the Steel Pool is fixing prices, State Dept. has demanded that ECSC High Authority look into the matter. Some South American and Scandinavian countries joined the U. S. in demanding a review of the price fixing agreement by the High Authority.

### Prices Vary

Despite State Dept.'s coyness in openly charging that Steel Pool countries are fixing prices, it is no secret that this practice is being followed. The High Authority admits it, as do European steel

producers. Neither group, however, is willing to tell the State Dept. which countries are a party to the price agreement.

European steelmakers say the High Authority has no jurisdiction over an agreement to fix export prices. The High Authority, however, says it does, if such an agreement adversely affects competition within the countries making the agreement, or if inequitable price differentials are made between dollar and non-dollar countries.

### Fear Cartel

It is apparent however, that ECSC countries are discriminating in fixing steel prices for different countries. Last week, for example, the Steel Pool's export price on merchant bars was reduced in the following manner: for the U. S. and Canada the price was dropped from \$84 to \$80 per metric ton; for other dollar markets the bars were reduced from \$93 to \$84, while in non-dollar areas the price was lowered from \$93 to \$86.

State Dept.'s concern in the matter is both due to the fact that there are price differentials and because the policy of fixing export prices suggests a cartel operation.

Right now the State Dept. is waiting to see what will happen as a result of the High Authority's review of the price-fixing agreement. High Authority says it has already started an investigation and will take some sort of action.

## Set Aside Defense Aluminum

Business and Defense Services Administration has set 194 million lb as the amount of aluminum to be set aside for possible defense needs during first quarter 1954.

This figure is 41 million lb less than the fourth quarter setaside, reflecting a tapering off in military requirements.

First quarter setaside represents roughly 24 pct of the expected primary aluminum production during the first 3 months of 1954.

Both defense and atomic energy requirements are covered by the 194 million lb to be held out.



"... started on shoestring, went heavily into debt and lost even the shoestring."

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MULTIPRESS . . . smooth oil-hydraulic power, designed for cost-cutting production

# MULTIPRESS®

## Improves DEEP DRAWING Production for Radiad\*

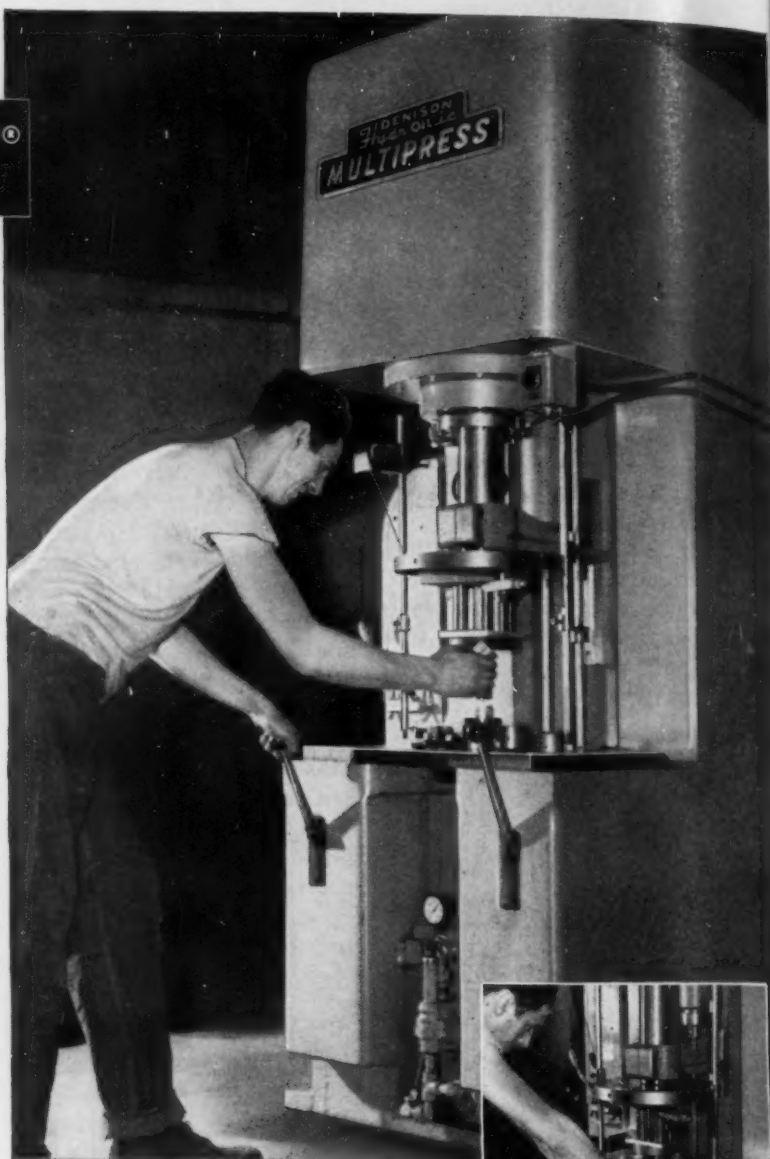
"We find that the smooth, evenly controlled speed of the Multipress ram does a better job on a wide range of deep drawing operations," says Mr. Ed Foertsch, President of \*Radiad Service, Inc., Chicago.

For most deep drawing operations, Radiad, a widely experienced contract manufacturer uses the 50-ton Denison Multipress. A second hydraulic ram mounted in the U-slot base of the press permits up to 8 tons of upward pressure . . . for added cushioning effect on some operations.

"We also gain by pinch-trimming many flared-lip shapes as part of the final draw," Mr. Foertsch added.

Like many other users, Radiad has proved to themselves that Multipress, with its versatility and speed, is the low-cost answer to drawing needs.

There's no hammer-blow impact as Multipress tooling contacts the work. A steady, positive stream of power draws the metal SMOOTHLY into shape. Stroke length, ram speed, and pressure limits are easily pre-



set to suit each job, or to the flow characteristics of any metal. And the Multipress ram can be set to reverse the instant a pre-set pressure is attained.

As a result, deeper draws can be made. Multiple-stage jobs can often be handled in half the draws required by other equipment. There's less wear and tear on tooling. Costly dies last longer, are less subject to damage. And the need for pre-draw annealing is often eliminated.

Dual Multipress controls increase safety on drawing jobs at Radiad.



INDUSTRY'S  RIGHT HAND

**DENISON**  
*HydrOILics*

Many additional features make Multipress a profitable investment; not only for drawing, but for broaching, bending, forming, stamping, staking, crimping, flaring, riveting, and many other operations. Multipress is built in both bench and floor models; one-ton to 75-ton capacities. Manual or automatic controls for any requirement. Standard Multipress accessories available for many specialized operations. Send for a copy of "MULTIPRESS, and how YOU can use it" or write for information covering your specific needs. There's no obligation.

The DENISON Engineering Company, 1158 Dublin Road, Columbus 16, Ohio

## Area Plate Shortage Easing Coming

**Kaiser to add about 120,000 tons of plate, sheet, tinplate capacity at Fontana . . . Expansion to cost \$8 million . . . West's tinplate tonnage to hit 550,000 by '55—By T. M. Rohan.**

Traditional severe shortage of plate in the West and lesser deficits in sheet and tinplate should ease somewhat next year.

Additional plate, sheet and tinplate capacity of about 120,000 tons will be added by Kaiser at Fontana in an \$8 million expansion program announced last week. Addition of a third slab heating furnace and revamping of the firm's blooming mill, already modified several times, will increase output of hot-rolled products by about 10,000 tons per month.

**Boost Differential Coating . . .** New plating tanks with increased amperage will step up capacity for electrolytic tinplate including differential coated. Continuous shearing off the line will be eliminated with the sheet and tinplate being coiled and carried to a new storage and shearing area.

The new plate capacity will, to some extent, relieve the area shortage of 10 years standing. Western plate fabricators are still on strict allocation and predicate their sales on quarterly allotments. Extra tinplate tonnage will by 1955 increase annual western output to about 550,000 tons, 61 pct of the California market of 900,000 tons. Output this year is expected to be about 450,000 tons or 55 pct of consumption, local production exceeding eastern produced tinplate for the first time.

Construction, financed by 4¾ pct first mortgage bonds to insurance companies, is starting immediately with completion scheduled for fall of 1954. Reduced steel mill construction nationally may improve equipment deliveries, advancing completion date.

**Widen Blooming Mill . . .** Major item of construction is widening of the 36 in. blooming mill to 48 in. through addition of new pinion stands. This will eliminate slow broadside passes on the plate mill on 36 to 48 in. slabs and reduce them on pieces over 48 in. A new slab furnace, slab yard and additional heating capacity will handle increased output.

A coil conveyor will be installed to remove congestion at the end of the sheet mill since space limitations will not permit another crane. Two additional plating tanks with higher amperage will bring up speed of differential coating to the existing faster capacity on uniform coating.

Electrolytic tinplate capacity will be raised from 130,000 annual tons to 200,000. Two additional annealing furnaces with 6 covers will also be added. About 8-9 pct of tinplate now being consumed in California is differential coated but will increase.



**More Western Metalworking . . .** The greatest future market for steel in the West will be increased metalworking rather than the traditional construction of a growing area, according to Jess Honeycutt, Bethlehem sales vice-president.

Addressing steel warehousemen in San Francisco and Los Angeles last week, Mr. Honeycutt added that as population grows, steel consumption for metalworking will increase from the present 40 pct in the West closer to the national average of 66 pct.

Walter S. Doxsey, American Steel Warehouse Assn. president, said steel on order and in process for delivery to warehouses in the next 90 days will bring inventories to pre-Korean levels with only a few regular stocked items missing. Northern California warehouse sales, he predicted, will be 5 pct over last year compared to 15 pct increase nationally.

**Start Uranium Mine . . .** The first U. S. mine designed especially for uranium will be started soon in Shiprock, N. M., it was announced last week. The Western-Knapp Engineering Div. of Western Machinery Co. of San Francisco announced start of design work on the \$3-million ore treating plant, latest of eight in the area.

A sulphuric acid circuit will be used, involving special stainless steel equipment and protective coatings. Plant will be designed especially for uranium with vanadium as a byproduct, all other U. S. installations being either the reverse or conversions of existing installations.

A small American Smelting & Refining Co. sampling plant is now in operation there. Unit will be built for Kerr-McGee Oil Industries, Inc. of Oklahoma City which acquired the property 3 years ago from Navajo-Uranium Co. Uranium oxide of undisclosed tonnage will go to AEC.

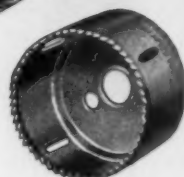
# Cut...

## LARGE HOLES

... thru any machinable material up to  $1\frac{1}{8}$  INCHES thick!



Here is a premium tool which makes it possible to saw holes in one short operation ... large holes which heretofore had to be laboriously machined "a-chip-at-a-time."



MARVEL High-Speed-Edge Hole Saws have strength to withstand the terrific peripheral strains of heavy duty operation in lathes, drill presses or portable power tools. They have a high speed steel cutting edge which is electrically welded to a tough, alloy steel body, high speed steel pilot drills, heavy hexagonal shanked arbors and sufficient set for deep drilling. They are self-aligning, as the larger diameter saws float on their arbors and are driven by double drive pins. They will saw round holes accurately in any machinable material.

MARVEL High Speed-Edge Hole Saws come in 35 sizes, from  $\frac{5}{8}$ " to  $4\frac{1}{2}$ ". They are carried in stock by leading industrial distributors.

WRITE FOR BULLETIN ST-650

**"MARVEL" has Always had the edge!**

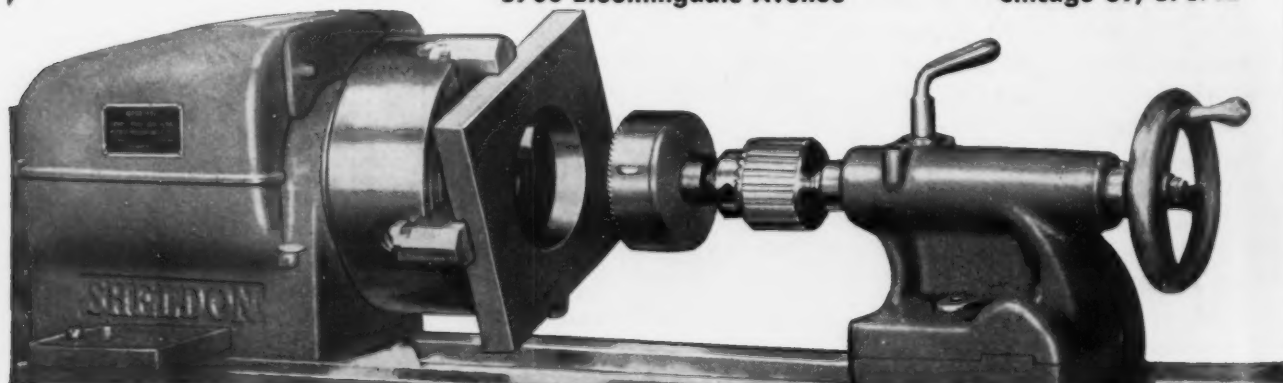


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## Machine Tool High Spots

### Problems Are the Same—Only More So

**Less defense spending, renegotiation, foreign competition industry's main headaches . . . Bergstrom outlines solution . . . Praises ODM leasing policy—By E. J. Egan, Jr.**

A realistic analysis of the machine tool market and effective measures needed to meet the challenge of world competition, were presented to industry members last week by Swan E. Bergstrom, president of the National Machine Tool Builders' Assn. and vice-president, The Cincinnati Milling Machine Co.

Addressing the association's annual meeting at Boca Raton, Fla., Mr. Bergstrom said, "Our problems still remain pretty much the old ones . . . the only difference seems to be in the magnitude of each of these old problems."

**Korea, Renegotiation Problems** . . . Enumerating recent developments which have increased the size of the industry's more or less constant problems, the speaker mentioned seven factors that will affect the future course of American machine tool production and sales.

First on the list is the truce in Korea and the resulting slowdown of defense spending for machine tools.

Extension of the excess profits tax will also have its effect, he

said, as will the still unsolved renegotiation problem.

**Exports "Dried Up"** . . . On the credit side, Mr. Bergstrom placed the recent policy decision of the Office of Defense Mobilization that no leasing of government-owned machine tools for non-defense purposes will be permitted without ODM approval. Leasing will be allowed only in extraordinary cases deemed necessary for the general welfare of the whole nation.

Completing the list of problems that must be seriously considered, the NMTBA head declared, "Exports of machine tools have practically dried up, while the import of foreign tools is continuing at an alarming high level."

**Need Tariff Protection** . . . On the export side, he pointed out that American funds for reconstruction after World War II have resulted in the establishment of a strong West European machine tool industry. Increased foreign tool production has seriously cut American exports and now poses a definite threat to domestic markets.

This threat will become even more severe if proponents of reduced tariffs on capital goods imports have their way, Mr. Bergstrom maintained.

"Not that we are asking for such tariff protection as to exclude foreign competition," he said, "but certainly we should continue to have a type of protection that will not only give us an opportunity to meet competition here at home on an even basis, but enable us to maintain . . . the very basic industry that is the foundation of our productive strength in peace and war."

**What Can Be Done?** . . . Mr. Bergstrom listed several positive approaches that the industry must take to meet its large-scale problems:

(1) "We must resort to American ingenuity in designing and building better and more productive machines than anybody else in the world."

(2) "We must endeavor to work with government agencies in order to provide them with the information and knowledge that will enable them realistically to appraise the importance of our industry to the national welfare."

(3) "Our salesmen must train and condition themselves to sell more competitively than they have done in the past 13 years."

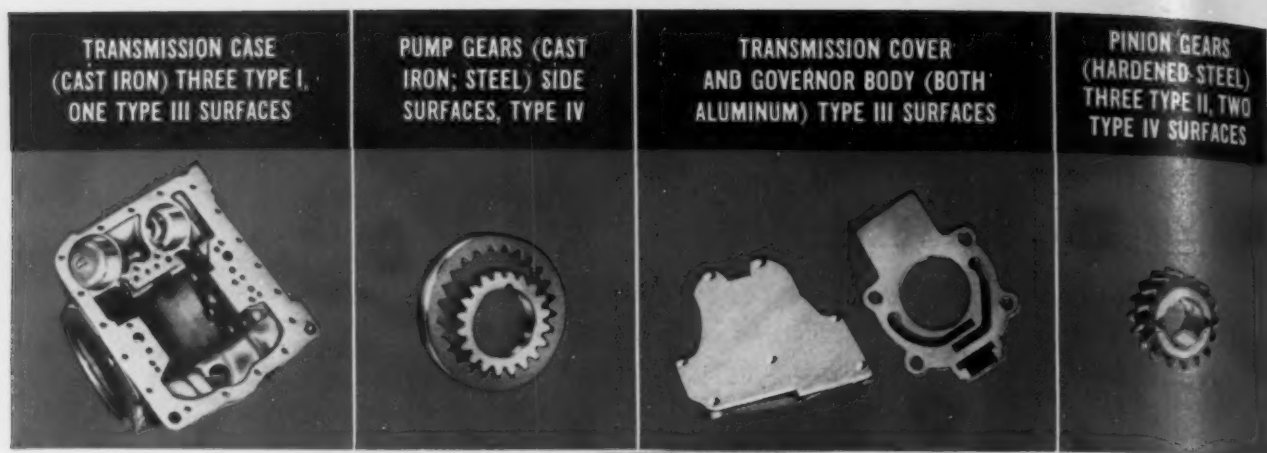
(4) "We must be prepared to tap the biggest market for our industry—the replacement market."

### Machine Tool Builders Elect Officers



CHOSEN as the new officers of the National Machine Tool Builders' Assn. at the group's 52nd annual meeting last week were: (left to right) H. L. Tigges, president; M. A. Hollengreen, first vice-president; L. Polk, second vice-president; J. C. Cotner, treasurer.

New directors elected in addition to Mr. Polk, were E. M. Hicks, of Norton Co., and W. E. Rutz, of Giddings & Lewis. Tell Berna (not shown) was reappointed as general manager of the NMTBA. Among the speakers was Swan E. Bergstrom.



## FOR PRECISION FINISHING OF FUNCTIONAL SURFACES

*PowerFlite* transmission parts  
are *Microhoned*

Chrysler engineers, with years of proficiency in production-processing of precision parts, have specified the Microhoning process as the method for obtaining

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required for the efficient functioning of the new *PowerFlite* transmission.

### FOUR TYPES OF SURFACES IN THE *PowerFlite* ARE MICROHONED:

**Type I**—Cylindrical surfaces through which a piston or valve moves.

These surfaces must be round, straight and accurately sized, with a controlled surface finish—in order to minimize wear and eliminate oil leakage. The Microhoned finish assures non-flaking surfaces between the stationary and moving parts.

**Type II**—Cylindrical surfaces in rotating parts.

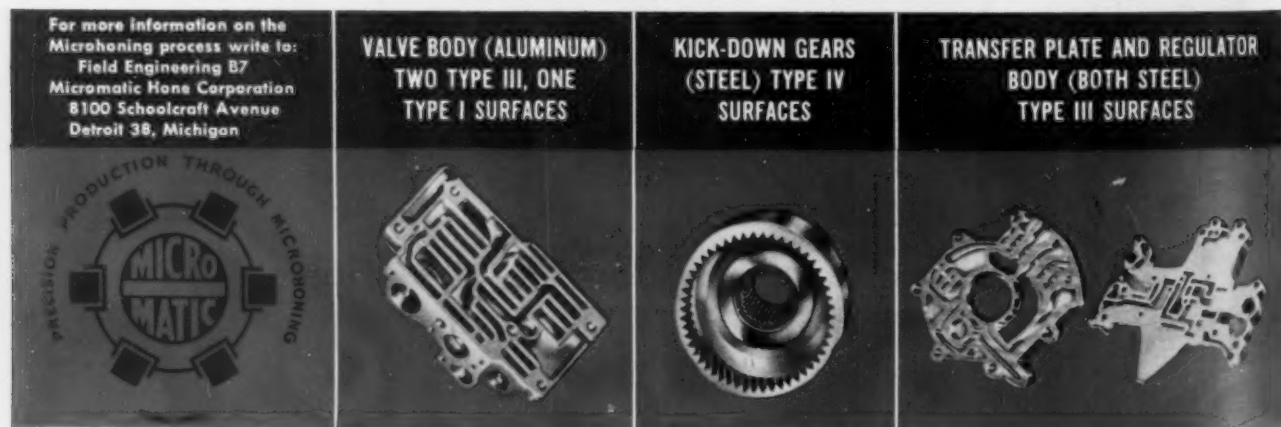
Microhoning maintains concentricity of pitch diameter of teeth and the bore of gears, permitting teeth to mesh with minimum noise and wear. The bore must have precise geometry, size, and functional finish to retain a lubricating film at high speed.

**Type III**—Flat surfaces that are bolted together without a gasket.

They must be flat enough so that they will not distort when pulled together, and must have a surface finish that will mate to form a tight, effective seal.

**Type IV**—Flat surfaces that move in contact with stationary surfaces.

These must be smooth and flat in order to minimize friction and wear, and maintain a "running seal", thus eliminating leakage.



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# REPORT TO MANAGEMENT..

Rumble  
of adjustment

You have heard much of industry's determination to stay competitive, hold its fair share of the market. Meanwhile, within industry there has been the rumble of vast internal adjustment that included shortening inventory, hunting for means to cut costs, pruning overtime, buying on a short term basis.

Supply caused  
transition

Has this bracing for competition, maneuvering for best position been bred of recession fears and an actual drop in consumer demand? Only to a trifling extent. Its main source has been obliteration of the lead demand held over supply. When the capacity to produce caught up and passed the consumer's enormous appetite to buy, industry started to align its tempo and policies to realities of current demand. So this initial step of transition to more normal markets came not from a decline of consumer buying but because supply slightly outstripped demand. Sporadic but negligible layoffs indicate industry's surveillance of demand, its care not to produce beyond it.

Reshuffle  
market shares

With the boom has come an era of expanding supply to cope with large demand. Even if high levels of buying stay at record, the upsurge in supply will be enough to harden competition. Yet, any slight easing in demand will hone a sharp edge to this competitive trend. Smaller firms and "independents" must struggle doubly hard to retain their boomtime share of the market.

Construction  
to stay high

Often mentioned weapon against high costs, recession is heightened productivity. Next year you will see emphasis on most efficient mechanization flourish and help bolster capital goods expenditures. Dept. of Commerce estimates new construction in '54 will total \$34 billion, only 2 pct under '53. According to studies made by Stanford Research Institute, the average American worker in 1950 was nearly three times as productive as his Western European counterpart. He could also buy three times as much with his earnings. While America has seized a wide lead in productivity, signs are that Europe is now matching our annual gains and West Germany is shortening the gap.

Income points  
the trend

Slightly easing personal income, seasonally adjusted on an annual basis, indicates the economy is now absorbing some adjustment from boom. For the past year, income has marched consistently up. With July's rate at \$287.5 billions, a trifling dip in August to \$287 billion significantly reversed the upswing. By inching down to \$285.8 billion, the September rate confirmed the trend. Wage and salary disbursements have also eased.

Concern over  
imports

Exports and imports softened slightly in August, with U. S. exports dropping to \$1,174.6 million in August from \$1,341.3 million in July. Lower exports of finished manufactures caused most of the drop, are stirring up some concern. Meantime, the dip in imports for consumption from \$892.6 to \$835.6 million was derived from lower shipments of all goods we buy.

Nonferrous  
trends

Aluminum is easing but base prices are steady and probably will stay static until wage talks next year. The copper market is comfortable. When U. S.-Chile deadlock on copper terms dissolves, price may soften a little. Some of the steam behind recent copper increases comes from heavy European demand, raids on our supply.

November 19, 1953

REPORT TO MANAGEMENT-REPORT TO MANAGEMENT-REPORT TO MANAGEMENT

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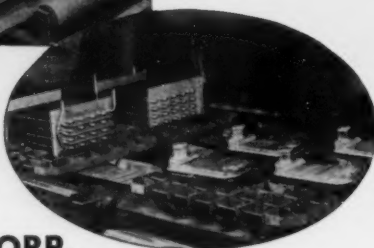
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## FABRICATED ALLOYS



Rolock "Serpentine" Trays carry Condenser Units on powered rollers thru furnace, for brazing at 2050°F.

**BRAZING TRAY life**  
**increased 140%**  
**Maintenance decreased 100%**



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Rolock "Serpentine" furnace trays, built for this specific use, were furnished in two sizes . . . 24" x 30" (weight 22 lbs.) and 24" x 36" (26 lbs.). The maximum load carried by the larger tray is 80 lbs. . . in brazing, an exceptionally good ratio of load to weight. Some trays are of type 330 stainless, others are of Incoloy.

Trays formerly used had a maximum life of 2500 trips thru the furnace. Rolock trays give a minimum of 6000 trips . . . then are rebuilt for additional service.

Former trays required maintenance by one full-time skilled worker and a part-time helper; "Serpentine" have required absolutely no maintenance. Moreover, other trays frequently jammed in the furnace, causing costly down-time of the whole line. "Serpentine," no jamming, no down-time.

The answer, of course, is in the fully articulated "Serpentine" construction which resists warping to the highest degree. If this is one of your problems, write Rolock for practical solutions.

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### Free Publications

Continued

#### Boiler-burner units

A fully automatic pressurized boiler-burner unit is described in a new catalog by Iron Fireman Manufacturing Co. and Titusville Iron Works Co. The unit features greater furnace volume and staggered tube design, has a 5-1 turn-down and is claimed to operate at more than 80 pct efficiency through its entire modulating range, burning either gas or oil. Ratings, data and dimensions are given in the catalog. Iron Fireman horizontal rotary oil burner and Iron Fireman gas and oil firing with built-in forced draft are also included. *Iron Fireman Mfg. Co.*

For free copy circle No. 12 on postcard, p. 121.

#### Gasoline engines

New bulletin on complete line of Fageol Gasoline engines for stationary, automotive and marine applications has been released by Fageol Products Div. of Twin Coach Co. Bulletin is profusely illustrated with photographs, cutaway and section views, horsepower and torque curves, dimensional drawings and condensed specifications. *Twin Coach Co.*

For free copy circle No. 13 on postcard, p. 121.

#### Milling cutter

There are only 3 essential parts, body, blade and wedge, in Kroslok milling cutter, manufactured by Motch & Merryweather Machinery Co. Technical data, illustrations and diagrams of the machine are given in new brochure. Also featured is Kroslok heavy duty face mill for which extra heavy blades are available in either high speed steel or carbide-tipped. *Motch & Merryweather Machinery Co.*

For free copy circle No. 14 on postcard, p. 121.

#### Steel bibliography

Valuable bibliography on low temperature characteristics of steels has been issued by International Nickel Co. The 48-p. reference booklet covers the years from 1904 to June 1953. It lists chronologically 468 U. S. and foreign magazine articles, translations and books. *International Nickel Co., Inc.*

For free copy circle No. 15 on postcard, p. 121.

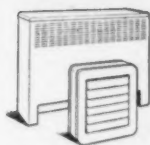
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November 19, 1953

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# NEW EQUIPMENT

New and improved production ideas, equipment services and methods described here offer production economies . . . just fill in and mail the postcard on page 121 or 122.

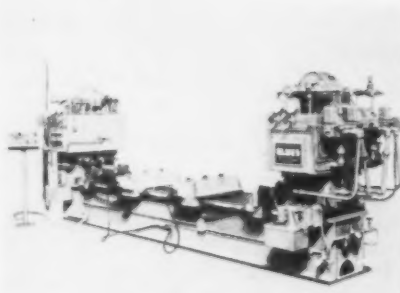


## Precise control for selective heating operations

High heating capacity, versatility, and controlled results are features of the new Cincinnati Flamatic Power Control Unit, a central unit that controls fuel gas and oxygen for various selective hardening operations. It embodies the basic Flamatic principles of precise control of temperature to insure uniform results; accurate metering of fuel gas and oxygen to achieve exact control of heat input; and automatic cycling except for load-

ing and unloading parts. It permits the user to employ a wide variety of simple, low cost tooling and work handling operating units. The unit also controls pressure of water for cooling and quenching; air for actuating cylinders, and controls electrical power for automatic work movement and operational cycling. Three sizes have 2, 4, and 6 mixed gas circuits respectively. *Cincinnati Milling Machine Co.*

For more data circle No. 16 on postcard, p. 121.



## Press reduces both ends of tube in 1 operation

The double-end tube reducing hydraulic press is designed to reduce both ends of a tube simultaneously. The two-station machine uses a preliminary reduction as well as a final reduction die. These dies are mounted internally in each ram along with an internal automatic

hydraulic knockout in each ram. As the ram returns, after the reduction, the knockout automatically ejects the tube. The press is fully automatic and can produce 150 tubes per hr. *American Steel Foundries, Elmes Engineering Div.*

For more data circle No. 17 on postcard, p. 121.

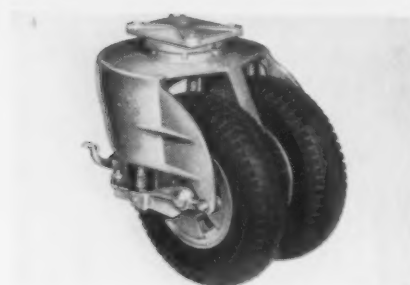


## Steel-reinforced flooring is a packaged unit

Heavy duty flooring called Steel-Rock, combines a heavy steel mesh and special filler as a complete unit for surfacing floors subjected to extra-tough abuse. This tough flooring meets rugged requirements of modern industrial production and materials handling problems; is engineered to combat floor destruction caused by tons of heavy rolling

traffic. The resilient fill used in the grid compacts to meet the level of the steel ribs, permitting the wheels to ride on steel without the noise and slipperiness of a solid steel surface. The product may be applied over new or old surfaces of wood or concrete, inside or outside. *United Laboratories, Inc.*

For more data circle No. 18 on postcard, p. 121.



## New assembly assures smooth load-glide

This new Aerol 16-in. pneumatic wheel and caster assembly has been designed for heavy duty service. Individual springs and dual-shock absorbers together with the pneumatic tires assure smooth load-glide over all rough surfaces. The unit has a special anti-shimmy

brake that is said to permit high speed operation without vibration. Weight of the complete wheel and caster assembly is 75 lb. It is cast of heat treated 365 aluminum. *Aerol Co.*

For more data circle No. 19 on postcard, p. 121.

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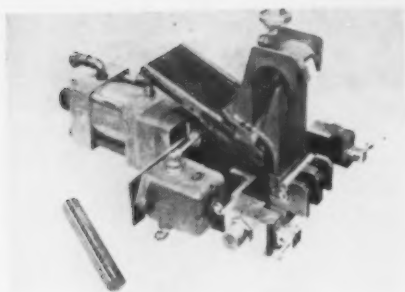
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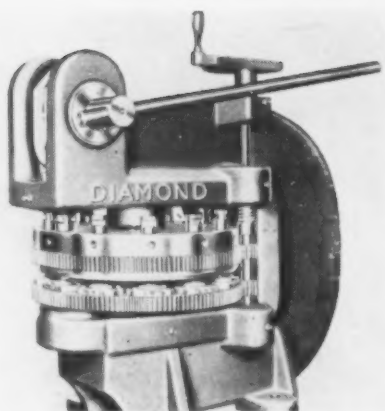


### Automatic loaders for broaching machines

New line of Red Ring automatic loaders for single ram vertical surface broaching machines are particularly adapted to the handling of round parts on which flats, slots or ends are broached in single ram machines. The loaders have magazine feed arrangements that work

in conjunction with a hydraulic cylinder powered load and unload mechanism. The 1000 psi hydraulic control cylinder is flange mounted at the rear of the loaders and is operated by an air booster. *National Broach & Machine Co.*

For more data circle No. 20 on postcard, p. 121.



### Punch indexing control positions die sets on press

Hand operated turret punch press has a punch indexing control for automatic exact positioning of die sets. Punches and dies are geared together for permanent precision alignment and lock rigidly in punch position. Turret has a 13-in. throat and contains 12 punches and dies that are interchangeable between turret positions. Turrets are geared together with self compensating gears to eliminate backlash. The

interior is lighted to permit easy spotting of pilot holes or center punch marks. Capacity is 10 tons and maximum punch size is 1½ in. with ⅛-in. mild steel; 3/16 in. diam in ¼-in. steel. The ram is actuated by a generated cam which delivers a variable ram pressure. Maximum punch life is obtained through use of a heavy 600-lb frame. *Diamond Machine Tool Co.*

For more data circle No. 21 on postcard, p. 121.

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Diagram shows assembly of links, rollers, chain and side wings.

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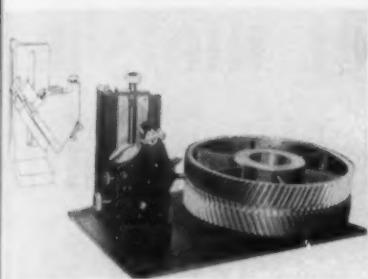


### Thirty models in new line of air control valves

Complete line of solenoid pilot-operated air control valves are available for 3-way, 4-way and 4-way 5-port (two pressure) application in pipe sizes  $\frac{1}{4}$  through 1 in. All types and sizes are furnished either for foot mounting or sub-base manifold mounting in accordance with J. I. C. specifications. A total of 30 new valves is included in this line to fully handle any type or size of application re-

quirement. All parts are non-corrosive. The main valve body and the sub-base are cast bronze. The spool is stainless steel, hard plated and polished to assure long life to the special Hycar O ring seals. The spool is the one moving part of the main valve body, and all parts are easily accessible without disturbing the piping to the valve. *Valvair Corp.*

For more data circle No. 22 on postcard, p. 121.



### Metal hardness tester does not use clamps

The Penetrascop multiple angle metal hardness tester consists of a modified portable Penetrascop, movably mounted on a slotted stand, the base of which contains electro-magnets that hold the unit firmly to a surface table, layout ta-

ble, or other ferrous base. The object to be tested is held secure, either by its own weight or mechanically. Both conventional and multiple angle testing are possible. *C. Tennant, Sons & Co.*

For more data circle No. 23 on postcard, p. 121.

Turn Page



FOR  
PRESS SCRAP

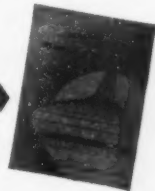
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**Lowest  
Use-Cost**

# you how Products† your costs!

†Product	USE
A.E.	Easy to handle, dry-type pickling product.
ALTREX*	Nonetching aluminum cleaner — meets government specifications.
B.N.	Versatile nonferrous electrocleaner.
BURNEK 22	Low cost ferrous and nonferrous bur- nishing product.
C.S.R.	Smut removing electrocleaner.
EMLON*	Highly stable, versatile emulsion cleaner.
F.S.*	Fast acting anodic steel cleaner.
HEDRAL	Dry-wall paint booth coating.
INDUSTRIAL "D"	Versatile water-wash paint-spray booth product.
INDUSTRIAL No. 38	High detergency spray washer cleaner.
MERSOSTRIP	Fast acting alkaline paint stripper.
NORDALL*	Economical, rust inhibiting emulsion cleaner.
No. 90	Chrome resistant electrocleaner.
PRE-FOS*	High detergency phosphating product.
R-2	Neutral rust inhibitor.
444-C	Brush-on organic paint stripper.
P-1075	Immersion-type organic paint stripper.
W.L.G.*	High detergency soak cleaner.
ZORBALL	Safest, lowest cost, all purpose floor absorbent.

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**Wyandotte Chemicals Corporation**  
Dept. 2134, Wyandotte, Michigan

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**"B" No. 3X**  
**HEAT-TREATED**  
**BARS**

**This higher-priced alloy steel can save you money!**

"B" No. 3X heat-treated bars offer many production economies, even though machined at about  $\frac{3}{4}$ ths the speed of annealed bars. They are supplied to your desired physical properties, and can be machined more easily than standard heat-treated bars with equivalent properties. The expense of scaling, distortion, straightening, and often grinding, are eliminated — as well as the cost of extra handling and heat treating of finished parts!

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BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS

**—New Equipment—**

*Continued*

**Cut wire shot**

Cut from high grade wire to form cylinders so that the length of each cylinder is equal to the diameter of the wire, L/D Cut-Wire Shot is a uniform-in-size and uniform-in-hardness abrasive for cleaning, peening, tumbling, cutting, and abrading. Uniform size means that each particle provides the same impact and finish. Uniform hardness results in maximum efficiency for each particle. L/D cut-wire shot is available in steel, copper and stainless steel in a range of wire diameters from 0.0625 to 0.020 in. with a minimum hardness range for the steel shot of 36 Rc to 46 Rc depending on wire diameter. For special applications, shot can be produced from any type of wire, and sizes can be varied. *Harrison Abrasive Div., Metals Disintegrating Co.*

For more data circle No. 24 on postcard, p. 121.

**Steel cage bearing**

This steel cage solid cylindrical roller bearing is designed for use on a hardened and ground shaft where space is limited and the housing cannot be hardened and ground to required tolerances. The bearing has a roller assembly and split outer sleeve; no inner race is necessary. When the split sleeve is



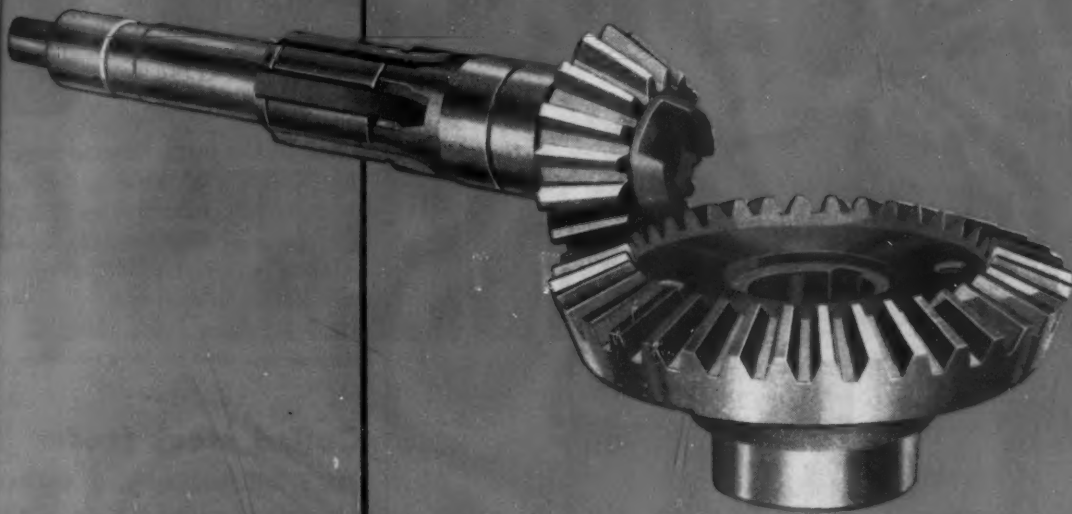
mounted in a housing bore, the point closes to a proper width while sleeve resiliency remains to eliminate any tendency to creep in the bore. The bearing provides adequate heavy duty performance up to speeds not exceeding 1000 rpm. Its component parts can be assembled separately into the machine in which it is to be used. *Rollway Bearing Co.*

For more data circle No. 25 on postcard, p. 121.

**Turn Page**

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Skilled Illinois Gear craftsmen are at your command to produce gears for every purpose—from gears rotating the massive, grinding weight of 100 ton shovels to gears controlling the tension of huge cylinders that speed delicate tissues through paper mills at thousands of feet per minute.

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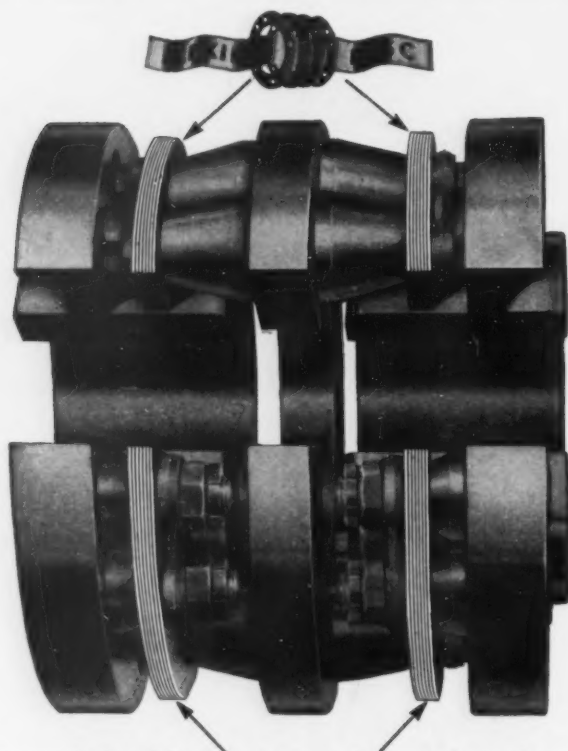
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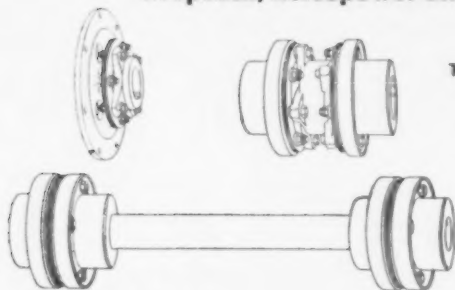
Specify THOMAS Flexible Couplings for Power Transmission

DISTINCTIVE ADVANTAGES of THOMAS ALL-METAL COUPLINGS	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes.



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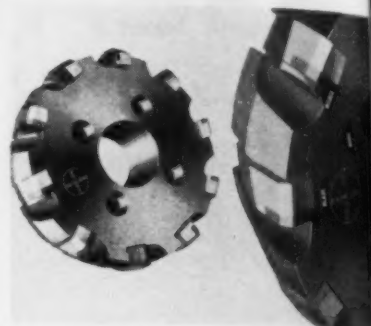
**THOMAS FLEXIBLE COUPLING COMPANY**  
WARREN, PENNSYLVANIA, U.S.A.

## New Equipment

Continued

### Milling cutters

Kroslok milling cutters have three basic members: body, blade and wedge. Cross serrations on one side of the body channel mate with similar cross serrations on the blade assuring rigid holding of the

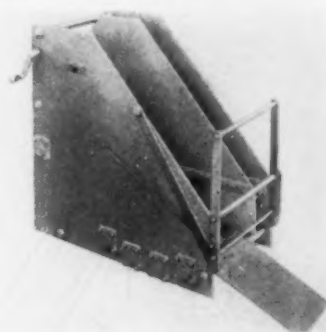


blade in the body. General purpose and heavy duty bodies are offered, both for ferrous and nonferrous applications. Blades are high speed steel or carbide tipped. Diameters: 3 to 24 in. *Motch & Merryweather Machinery Co.*

For more data circle No. 26 on postcard, p. 121.

### Coiled stock feeder

The Koil-Kradle automatically feeds all types of coiled stock to production machines. An automatic trip bar actuates a motor switch as the slack loop is tightened. The motor then feeds a new loop at the rate



of 90 fpm automatically shutting off when the correct loop size is reached. As a result, material is fed from a slack loop rather than from the full weight of the coil. Machines handle 10, 13, and 15-in. roll widths, 36 in. diam. *Benchmark Mfg. Co.*

For more data circle No. 27 on postcard, p. 121.

Turn Page

*In hydraulic systems*

**SUNTAC CUTS LEAKAGE**

**AN AVERAGE OF 35%**

This amazing average has been established by years of extensive use in many different industrial hydraulic systems. And results are immediate—leakage is reduced as soon as Suntac Oil is put in the system.

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## LEBANON STEEL Castings are at work

WHIPPING up a wind as high as 120 mph is the job of Elliott Company's Single-Stage Centrifugal Blowers. In these blowers the "tornado-builder" is a one-piece, open type, radial-bladed impeller—a Lebanon CIRCLE  casting engineered to withstand unusual service conditions.

These Elliott Blowers are widely used by the Chemical (particularly in sulphuric acid plants), Power, Refining and Gas industries where they run continuously, 24 hours a day. Such difficult service requires excellence of product design and manufacture, for a stopped blower can mean a plant shut-down. That Lebanon CIRCLE  castings are specified by Elliott is recognition, we believe, of the superior workmanship that is traditional with Lebanon Steel Foundry craftsmen.

See—STEEL WITH A THOUSAND QUALITIES—37-min., 16 mm, full-color, sound film on the making of steel castings. For information write: Dept. A, Lebanon Steel Foundry.

## LEBANON Castings

CARBON, SPECIAL ALLOY  
AND STAINLESS STEEL

LEBANON STEEL FOUNDRY

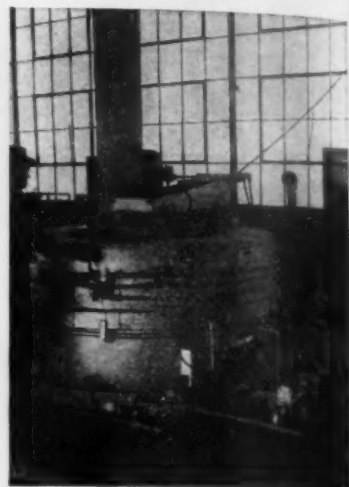
LEBANON, PA.

### New Equipment

Continued

#### Gas-fired furnace

A gas-fired, pit furnace for cycle annealing of small hand tools is available. It can also be used for carburizing, hardening and nitriding. A removable retort makes continuous operation possible since one retort can be discharged and re-



charged while the other is in the furnace. Maximum operating temperature is 1600°F. Firing of this furnace is completely automatic and a combustion blower system is contained for purging and cooling purposes. The furnace is available in five sizes. *Westinghouse Electric Corp.*

For more data circle No. 28 on postcard, p. 121.

#### Web coating sealer

A web coating material is applied with a spray gun and provides a tough, resilient seal against water and dust. Known as Presstite No. 209 Cobwebbing Sealer, the material is used principally in automobile construction as water and dust tight seal on inside door panels, such as on hinge and latch assemblies. It is capable of bridging cracks and holes up to 1 in. across. It is a continuous film or a coarse cobweb-like skin, depending on the size of the spray-nozzle opening and distance the gun is held from the surface to be sealed. *Presstite Engineering Co.*

For more data circle No. 29 on postcard, p. 121.

## Beryllium flake

A metallic beryllium flake of high ductile properties is available on a commercial scale. The flake has a minimum purity of 99.5 pct. Its exclusive feature is its high ductility, which makes it particularly suited to fabricating applications such as hot pressing. *Beryllium Corp.*

For more data circle No. 39 on postcard, p. 121.

## Foot warmer

A lightweight foot warmer, the Electro Mat, is 14 x 21 in. and weighs approximately 5 lb. It is small enough to be moved from machine to machine or from desk to desk without difficulty; consumes only as much power as a 100 v light bulb. High grade rubber construction insures long life use. *Interstate Rubber Products Corp.*

For more data circle No. 31 on postcard, p. 121.

## Loading dock shelter

New loading dock shelter for use when no loading dock is available is mounted on a concrete abutment. It provides complete protection to men and materials when unloading from a box car into a truck or vice versa. It is designed for efficient,

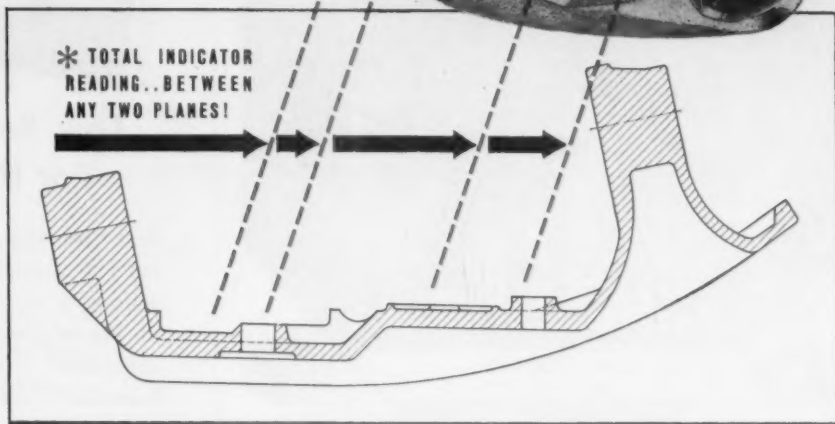


assembly-line production; permits individual engineering to fit specific conditions of installation. This model is a combination of standard Scissor and Outrigger dock shelters. The shelters fold neatly together when not in use. *Atlas Industries, Inc.*

For more data circle No. 32 on postcard, p. 121.

# Unitcastings

hold  $\pm .015^*$   
tolerance!



## ..substantially reduces finished cost!

Functioning as an important part of a mowing machine cutter mechanism, this Inner Shoe is responsible for holding all correlated parts in alignment. Accuracy must be maintained throughout the roughest service . . . and *initial accuracy* is a "must" in reducing assembly cost!

Unitcast "foundry engineering" successfully solved the basic problems. By holding a tolerance unusual in cast steel, the necessity of machining fit surfaces was eliminated and the result . . . *less finished cost!* Practical design and experienced foundry procedure met all other requirements for durability. To date, the accumulated production figure is well over 200,000 units . . . *with less than .002% rejection!* Another example of Unitcast's ability to produce quality steel castings!

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CASTINGS

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COMPLETE A CENTURY OF SERVICE

Nearing the completion of one hundred years in the fastening field, it was at the very beginning that CLARK BROS. knew while initiative starts a business, the trust of others maintains it, and only constant effort toward further improvement expands it.

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# The Iron Age

## SALUTES

*Charles L. Huston, Jr.*

His firm sense of responsibility and belief in mutual respect benefits his company and community.



THE personal touch has a special meaning for Charlie Huston. The youthful president of Lukens Steel Co. believes that industry has a deep social and economic responsibility to its employees and community neighbors. It's significant that his first duty at Lukens was director of personnel relations.

Charlie stresses that cooperation and understanding is not a one-way street. He feels that the company has a right to have others feel a sense of responsibility to it in areas where it works with them.

His company reflects Charlie's attitude of mutual respect for others. With a notable lack of fanfare, the Lukens management team has quietly carried out a modernization and diversification program which has put the company in its most solid market position in 143 years.

Charlie's sense of responsibility isn't limited to his company. For some years he's been a member of NAM's labor-management committee and American Management Assn.'s personnel planning council. During World War II he was a special mediating officer for National War Labor Board.

He has served his community as first president of The Family Agency of Chester County, Pa., a member of the board of managers of Coatesville Hospital, and an elder of the Presbyterian Church.

A Princeton and MIT graduate, Charlie's main interest away from the office is his wife and three children. He likes to slip away occasionally for a few days on his cruiser, *Charlenan II*, and hunting season finds him out gunning for duck and pheasant whenever he can.

A New Authoritative Book on  
Modern Gear Inspection

# ANALYTICAL GEAR CHECKING

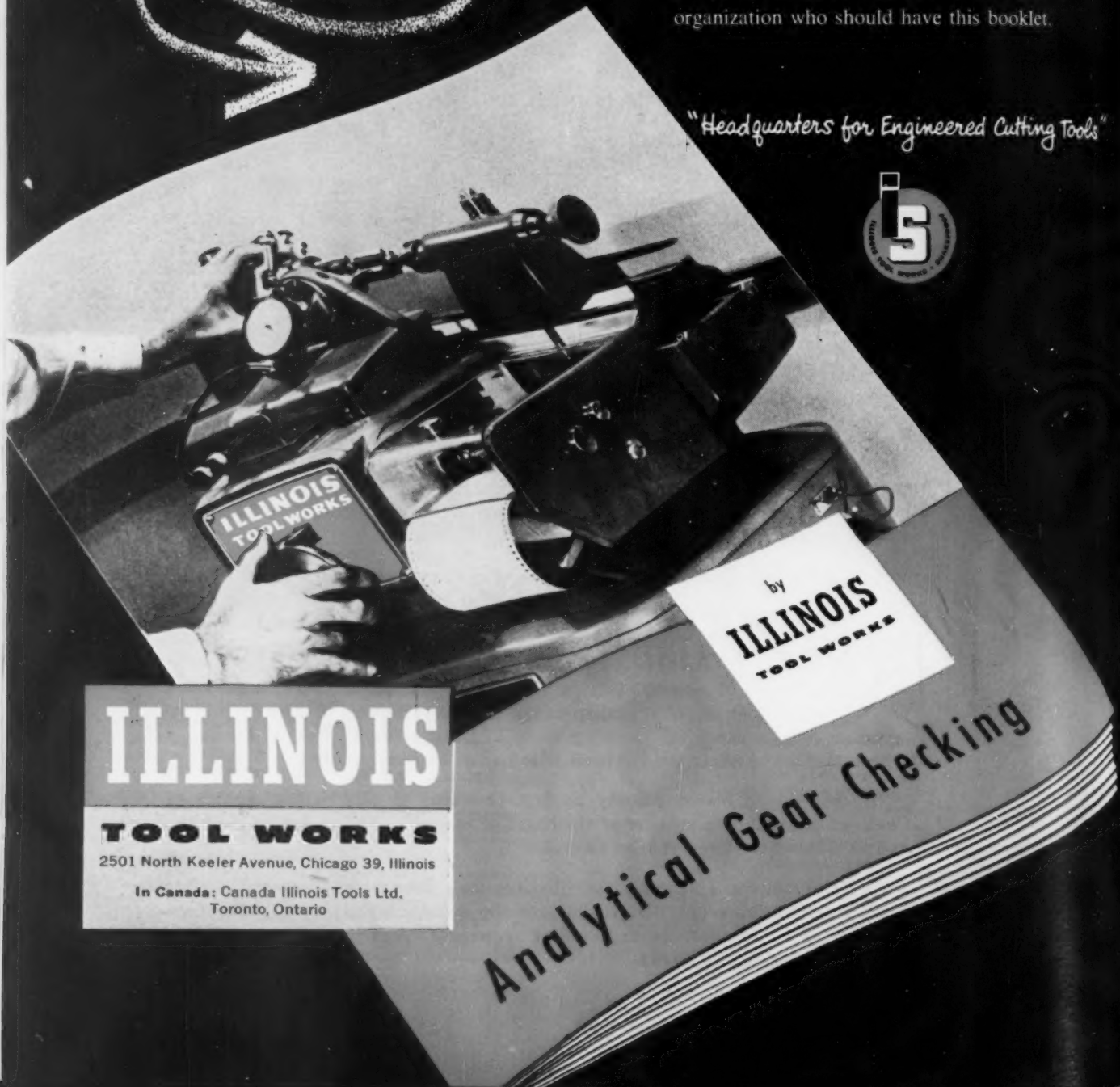
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# Analytical Gear Checking

# The Iron Age

## INTRODUCES

Dr. George A. Roberts, elected vice-president in charge of Technology, VANADIUM-ALLOYS STEEL CO., Latrobe, Pa.

Willis G. Scholl, vice-president, Tractor Div., ALLIS-CHALMERS MFG. CO., elected to the board of directors.

Charles M. Stainton, elected a vice-president, ROBERTSHAW-FULTON CONTROLS CO., Greensburg, Pa.

Harold E. Smith has been appointed director of market research, THOMAS A. EDISON, INC.

William H. Harris, Jr., elected to the board of directors, MICROMATIC HONE CORP., Detroit.

Alex Steward, named vice-president, director and general manager, NATIONAL LEAD CO., Ohio, contract-operator of the Atomic Energy Commission plant in Fernald, Ohio.

Walter R. Lowry, elected treasurer, effective Dec. 1, BERYLLIUM CORP., Reading, Pa.

George D. Hooper, joins Carboly Dept., as a development engineer, GENERAL ELECTRIC CO., Detroit.

Joseph P. Stanavage, joins the Research & Development Div., PENNSYLVANIA SALT MFG. CO. and will work on projects of the Corrosion Engineering Products Dept.

Walter C. Stoner, appointed assistant superintendent, Industrial relations, REPUBLIC STEEL CORP., Youngstown steel plant.

Richard P. Molt, promoted to assistant supervisor, Mechanism & Dynamics Research Dept., Armour Research Foundation of ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago.

Gilbert T. Bowman, named to newly created post of manager, Products Dept., Meter & Valve Div., ROCKWELL MFG. CO., Pittsburgh; O. W. Barnett, becomes Nordstrom valve products manager; and George A. Cunningham, named gas products manager.

G. F. A. Stutz, appointed manager of Technical Service, THE NEW JERSEY ZINC CO., New York; and Bruce R. Silver, becomes technical assistant to the vice-president.

Paul J. Selinger, appointed manager of stainless tubing sales, STANDARD TUBE CO., Detroit.

Thomas Hinchliff, appointed production manager, BOWSER TECHNICAL REFRIGERATION, Terryville, Conn.; Frank Radjeski, named plant manager; Norman Miller, becomes chief engineer; and Alan Hershey, heads the special projects engineering division.

Warren F. Bice, appointed manager of industrial fastener sales, Waterville, Conn., Div., SCOVILL MFG. CO.

N. F. Diederich, appointed manager of engineering, THE ELECTRIC PRODUCTS CO., Cleveland.

Lisle D. Hodell, named manager, new General Purpose Component Motor Dept., GENERAL ELECTRIC; Ab Martin, named manager, new Hermetic Motor Dept.; Carl W. Moeller, named manager, new Appliance Motor Dept.; and Jack J. Clarkson, becomes manager, new Specialty Component Motor Dept.

Richard I. Allen, becomes sales manager, Weiger Weed & Co. div., Detroit; FANSTEEL METALLURGICAL CORP.; and Floyd Cessna, becomes district manager, Cleveland.



CHARLES M. RUPRECHT, appointed president, Electro-Alloys Div., American Brake Shoe Co., New York.



HERBERT JOHNSON, named vice-president, Jones & Laughlin Steel Corp., Pittsburgh.



BURLEIGH L. OWENS, appointed director of marketing, Atkins Saw Div., Borg-Warner Corp.

## Personnel

**Robert B. King**, appointed production manager, Engine Machining, Aircraft Engine Div., FORD MOTOR CO., Chicago.

**E. H. Gross**, appointed to the Market Development Dept., BAKELITE CO., a division of Union Carbide & Carbon Co.

**Henry L. Pohndorf**, has been appointed sales manager, NATIONAL WELDING EQUIPMENT CO., San Francisco.

**Edmund L. Ryder**, appointed assistant manager, AIRESEARCH AVIATION SERVICE CO., Los Angeles; and **Frank R. Berry, Jr.**, promoted to chief engineer.

**Dr. John C. Hamaker, Jr.** has joined the Metallurgical Research Dept., VANADIUM-ALLOYS STEEL CO., Latrobe, Pa.

**A. M. Harrison**, appointed manager, Transportation and Generator Engineering Dept., WESTINGHOUSE ELECTRIC CORP.; and **P. G. Lessmann**, appointed assistant manager.

**James W. Kendrick**, appointed district sales manager, Fort Worth, Texas, THE COLORADO FUEL & IRON CORP.

**Alfred B. Kerber**, appointed sales manager, DAMASCUS TUBE CO., Greenville, Pa.

**Gordon J. Mitchell**, appointed superintendent, Industrial Relations, REPUBLIC STEEL CORP., Truscon Steel Div., Youngstown, Ohio.

**Stephen B. Metcalfe**, appointed assistant district manager of operations, Worcester District, American Steel & Wire Div., U. S. STEEL CORP.

**John B. Mitchell**, appointed general sales manager, KROPP FORGE CO., Chicago.

**Harvey V. Eastling**, appointed general manager, Pacific Div., San Francisco, LINK-BELT CO., Chicago.

**L. T. Mullan**, appointed field manager, Eastern Sales Div., KAISER-WILLYS.



**RAY F. ELLIS**, appointed director of sales, Atkins Saw Div., Borg-Warner Corp., Indianapolis.



**DONALD L. ANDE**, appointed general manager of warehouses, Jones & Laughlin Steel Corp., Pittsburgh.



**PAUL C. McCONNAUGHEY**, appointed sales manager, Gas & Coke Div., Koppers Co., Inc., Kearney, N. J.



**MASON BRITTON JR.**, named sales manager, Cincinnati Lathe & Tool Co., Cincinnati.

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Ever stop and think that the answer to your design problem may be simple perforations? Whatever material you're working with, if it's metal, masonite, rubber, plastic, hard or insulated board for decorative or display usage, Hendrick can help you. Over a period of many, many years Hendrick has built up the largest stock of dies commercially available.

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Continuing research, both inside and outside the organization, constantly adds to Chief Sandusky's metallurgical knowledge and production skills. Leadership in centrifugal castings, established more than 40 years ago, is thus maintained. By the most modern methods, Chief Sandusky makes castings varying from three inches to 54 inches in diameter, to 327 inches long.

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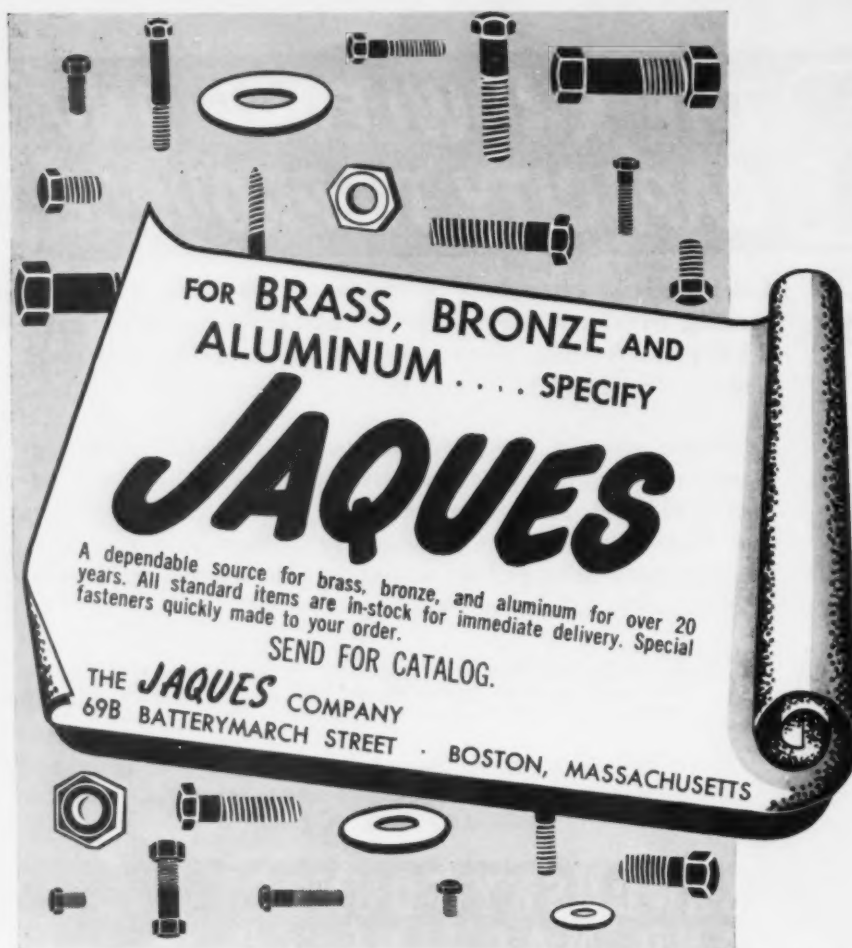
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Speeds,  
and Heavier  
Feeds**

Tipped) Cutters come in cased sets for tool rooms and maintenance departments, and individually in all sizes for general machine shop and production turning. They permit not only the ready machining of sand-filled castings, the hardest and toughest steels as well as many heretofore "unmachinable" materials, but also make practical much heavier cuts and cutting speeds up to 600 f.p.m. on ordinary work. They also run from 10 to 100 times as long between regrindings.

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NEW YORK · SAN FRANCISCO



### Personnel

*Continued*

**T. V. Learson**, appointed general sales manager, **INTERNATIONAL BUSINESS MACHINES CORP.**, New York.

**Craig T. Capp**, appointed general sales manager, **Barge & Towboat Div., INGALLS SHIPBUILDING CORP.**, Birmingham, Ala.

**Andrew J. Pratt**, has been named senior buyer, Purchasing Dept., **Fontana, Calif., KAISER STEEL CORP.**

**Sam F. Green**, appointed merchandising manager for commercial cars and jeeps, **WILLYS MOTORS, INC.**

**A. M. Neumann**, has been appointed chief engineer, **Evans Lead Div., NATIONAL LEAD CO.**, New York. He succeeds **William F. Schadel**, who has retired.

**Joseph J. Constantino**, becomes a design engineer, **HOOKER ELECTROCHEMICAL CO.**, New York.

**Henry Throop**, appointed sales representative, new Boise, Idaho, sales office, **Columbia-Geneva Steel Div., U. S. STEEL CORP.**

**Carl W. Hermann**, appointed exclusive representative, Equipment Div. in the Western states, **NATIONAL RESEARCH CORP.**

**Howard A. Reinhart**, appointed special representative, West Side Territory; **OHIO EQUIPMENT CO.**

**Austin Franklin**, appointed assistant controller, **HEWITT-ROBINS, INC.**, Stamford, Conn., **Howard Stoughton**, named assistant controller; and **R. B. Lape**, appointed assistant controller also.

**Carl W. Schwendener**, appointed factory manager, **Elgin Division, FLEXONICS CORP.**, Maywood, Ill.; **Fred A. Abben**, appointed industrial relations manager; and **Richard Benton**, appointed factory manager, **Rock Falls, Ill.**

**Michael R. Yatsko**, appointed superintendent of Industrial Relations, Warehouse Division, **REPUBLIC STEEL CORP.**, Youngstown, Ohio.

**William E. Johnson**, appointed sales manager, New York City Branch, **AUTOMATIC TRANSPORTATION CO.**, Chicago.

**Robert Eckenberg**, promoted to territory manager for Kansas, Oklahoma, and western Missouri, **CORY CORP.**, Chicago.

No draw or ironing—

# FIVE-STEP COLD EXTRUSION LINE Forms 60-mm Mortar Shells



By Ernest Olsen  
Methods Superintendent  
Oliver Corp.  
Springfield, Ohio

◆ Five cold extrusion presses form a complete line for forming 60-mm mortar shells without aid of other processing methods . . . Slugs are cut  $2\frac{1}{2}$  in. diam bar stock and put through a 65-pct reduction in each operation . . . Slugs weigh 1.58 lb compared to 4.25 lb for a forging . . . Steel saved on monthly production of 100,000 shells amounts to 265,000 lb.

◆ Only two annealing operations and three phosphate and lubrication coatings are necessary . . . Final physical requirements are attained after the third operation so that no further annealing or coating is required . . . Die design is of utmost importance, well-designed dies will last for more than 150,000 pieces.

◆ COLD EXTRUSION of 60-mm mortar shells is being done in five operations without supplementing the line by draw or ironing operations. The decision favoring cold extrusion over forging or stamping was reached by the Oliver Corp., Springfield, Ohio, after considering all factors. Despite certain problems such as a tapered tail section, and high yield, tensile and

elongation requirements, each of the five operations amounts to about a 65-pct reduction.

The steel slug used to produce the shell by extrusion weighs only 1.58 lb while some forgings for the same shell weigh 4.25 lb. Savings in material and labor are considerable due to less machining. On production of 100,000 shells per month, 265,000 lb of steel are saved.

**"After the first cold working and annealing operations the resultant slug is softer than before cold working starts. Annealing is done at a temperature of 1250°F for about 45 min."**

Another advantage is that by using 1010 carbon steel a yield point of 90,000 psi is obtained together with a 20-pct elongation. This is about three times the original yield strength and easily meets shell requirements. Also, the slug approximates the diameter of the finished piece which ends up as a cup having a very thick bottom with respect to the sides. Fewer operations are required than by drawing.

The first forming steel is a coining operation which produces some forward and backward extrusion. Slugs are sawed with a circular saw from a 12-ft x 2½-in. diam bar. Pieces are 1 3/16 in. long but are sawed to weight rather than length. This is done because of normal hot-rolled tolerances and weight must be held within 0.002 to 0.004 lb. By controlling weight at this point, trimming is eliminated on the press line.

Annealing of the slug before coining has little value. Hardness before and after annealing is between 62 and 65 Rb. Edges of the slugs

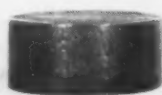
are chamfered to remove burrs caused by sawing. This eliminates the possibility of defective formation during extrusion and binding of the knockout in the die.

This first operation is important from the standpoint of setting up flow lines or slippage planes for future operations. These planes should be smooth flowing so that unduly high pressures are not built up and cause die breakage.

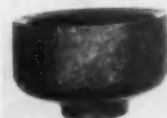
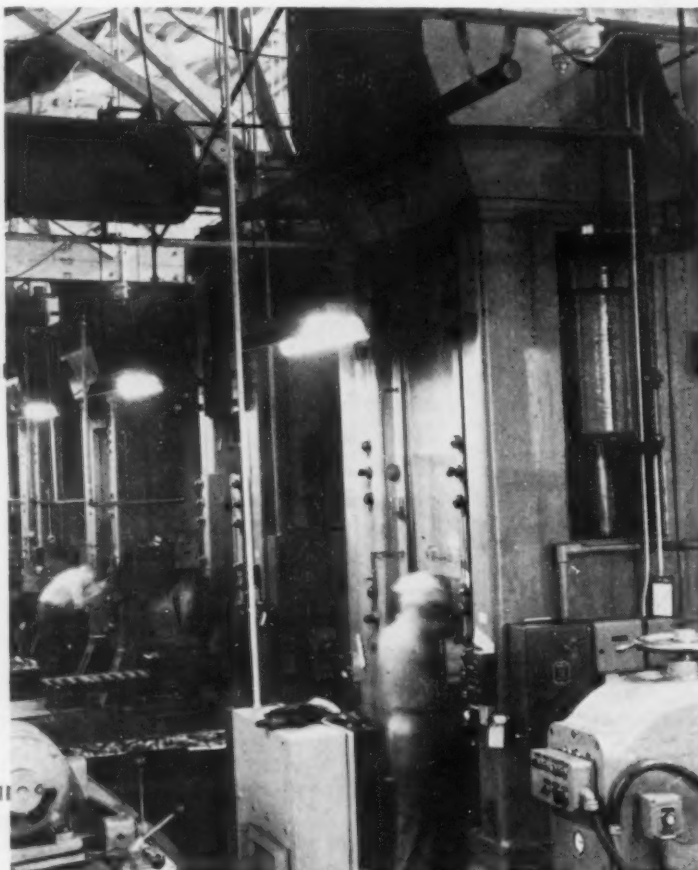
After the first cold working and annealing, the resultant slug is softer than before cold working starts. Annealing is done at a temperature of 1250°F for about 45 min.

The punch press for the first operation is an 800-ton knuckle press which exerts about 150-ton pressure per square inch of punch area. More than 150,000 pieces are run with one set of punches and pots so that die wear is negligible. The die material, a high-carbon, high-chrome steel, has a hardness of about 56 Rc.

The second operation is a backward extrusion



Slug . . .



Coin . . .

FRONT VIEW of the five-step cold extrusion line requiring no draw or ironing operations. One press is a knuckle type, three are mechanical eccentric type presses. The fifth is a crank press.

performed on a 600-ton eccentric-type press which accomplishes a 65-pct reduction. In this operation, as in the others, the punch press should be strong enough so that the punch will fail before damage is done to the press.

After the second operation, some extrusion lines revert to draw operations. Instead, this line performs a forward extrusion of about a 66-pct reduction with a 200-ton eccentric-type press. In a forward extrusion, metal flows ahead of the punch at a rate faster than the downward movement of the punch. To differentiate, in a backward extrusion, metal flows back along the lines of the punch.

### Metal flows back and forward

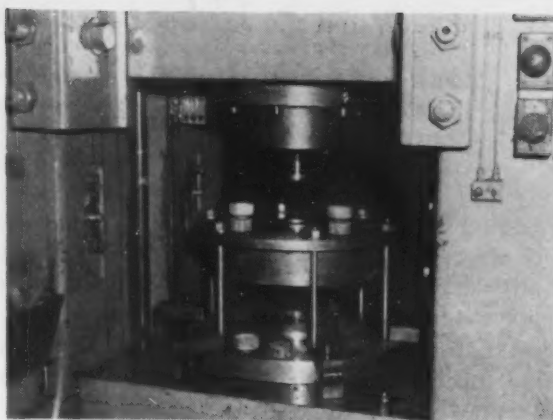
In this third operation, the final physical requirements of the shell are basically established. The yield point of the metal is increased from about 32,000 to 90,000 psi. The shell requires a 60,000-psi yield point. No further annealing, coating, or lubrication is necessary after this forward extrusion.

A 250-ton eccentric-type press is used for the fourth operation in which the shell is sized and the base extruded to the desired wall thickness. The metal is allowed to flow both backward and forward in this operation.

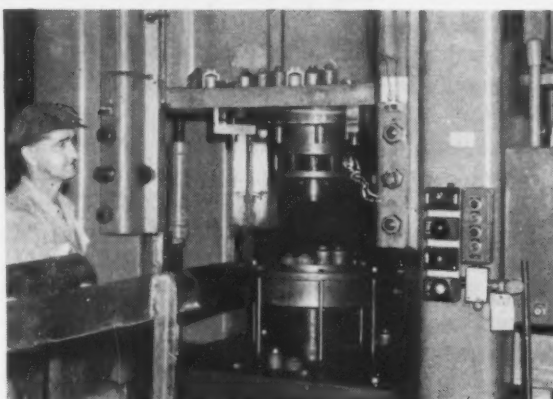
### Stress relief raises yield point

The fifth and last press operation consists of a combined forward extrusion and necking in. This is accomplished by having the pilot for the forward extrusion punch smaller in diameter than the inside of the shell. It results in about a 40-pct reduction.

The operator of this 150-ton crank press places the shell directly onto a mesh-belt conveyor of a stress-relief furnace. By stress relieving at 900°F, yield point is raised by 1000



STEP NO. 1 is a coining operation involving some forward and backward extrusion. Slugs are sawed to weight rather than length so that trimming is eliminated on the extrusion line.



SECOND OPERATION is a backward extrusion done on a 600-ton eccentric press. As in other steps, reduction amounts to about 65 pct.

to 2000 psi and elongation increased by 20 pct. Cycle time of the furnace is about 20 min.

In all five extrusion steps there are only two annealing operations and only three phosphate



Back extrude . . . Forward extrude . . . Taper and coin . . . Extrude and nose . . .

**"Punch and die surfaces give best results when their hardness ranges from 54 to 56 Rc. . . ."**

and lubricant coatings are applied. No washing or degreasing is necessary prior to annealing although most extrusion plants include these processing steps in their line.

Control of wall thickness and eccentricity has not been a problem in shell production by this method. Wall thickness can be held to any tolerance and will vary only by 0.0001 to 0.0002 in. from shell to shell.

Presses for this line, mainly of the mechanical eccentric type, were designed by Federal Machine & Welder Co. All can withstand more than 150 tons per square inch of punch area used in the actual extrusion. This would allow the punch to mushroom before damaging the press.

In setting up the extrusion line, several basic principles were followed. Any deviations could have led to trouble. Steel was selected so that the required physicals could be obtained with the least amount of die pressure and tonnage requirements. Also, material to be cold worked should be absolutely free of scale. This is usually done by pickling.

When a phosphate coating is applied, it should be complete and the piece properly lubricated. Soap or wax-type lubricants work well. Dies must be designed well, made with the correct material, be of proper hardness, and stress points properly analyzed to reduce breakage to a minimum. If dies are designed well, the phosphate coating will not break or scrape off while the metal is flowing.

Ordinarily, reduction per operation should be about 50 pct but in this line good success has been attained with reductions of 65 pct. Cold

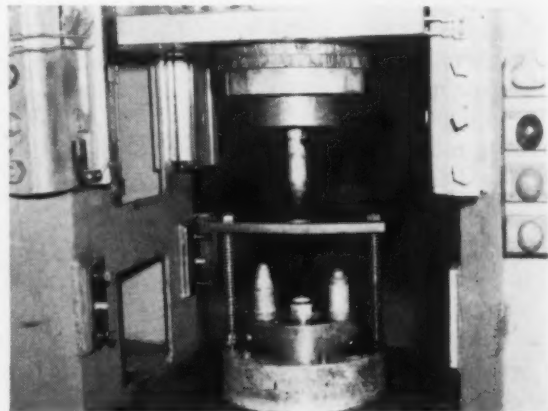
extrusion is done more readily if hardness of the steel is held around 65 Rb.

Punch and die surfaces have given best results when their hardness is 54 to 56 Rc. Smoothness of their finish is also essential. An 8 to 10 microinch finish has been very satisfactory. The die also tends to polish itself in operation.

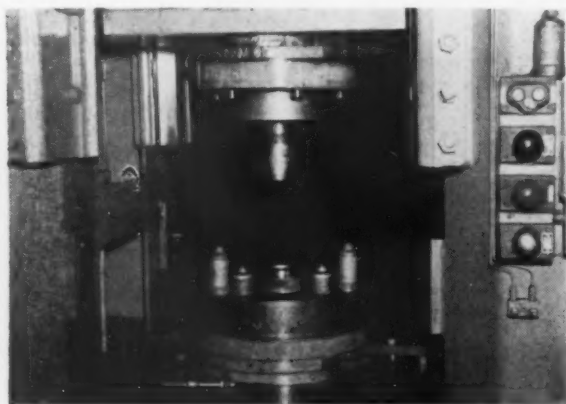
Another important point is that the compression rings confining the die pots should float so that all downward pressure is transmitted through the die pot itself. This prevents flexing or bending of the die, and eventual breakage, under pressure.

#### IRON AGE REFERENCES

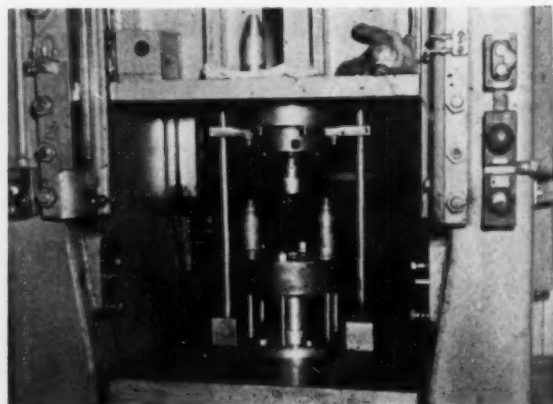
1. T. E. Lloyd and E. S. Kopecki, "Cold Extrusion of Steel," Aug. 4, 1947, p. 90.
2. D. I. Brown, "Cold Extrusion of 105-mm Shells Saves Steel," Oct. 19, 1950, p. 69.
3. D. I. Brown, "Cold Extrusion Ready to Invade Metalworking Markets," April 23, 1953, p. 152.
4. "Cold Extrusion Conference Outlines Industry Progress, Needs," June 11, 1953, p. 124.



**SHELL IS SIZED** and base extruded to desired wall thickness in fourth operation. Metal flows forward and backward in this step.



**YIELD POINT** of metal is increased from about 32,000 to 90,000 psi in third cold extrusion operation. Physical properties are established so that no more annealing or coating is needed.



**COMBINATION** of forward extrusion and necking is done in the fifth press operation. Shells are then placed on conveyor and passed through a stress-relief furnace at 900°F.

Stronger and cheaper—

# EXTRUDING FASTENER HOLES

## Simplifies Sheetmetal Assembly



By Federico Strasser

Consultant  
Santiago, Chile

◆ Instead of punching flat fastener holes in sheet stock, extruded bosses may provide faster, cheaper and stronger sheetmetal assemblies . . . Threaded bosses eliminate the use of nuts, and also provide greater holding power for self-tapping screws.

◆ Pointed or bullet-nosed punches are used to form bosses . . . Practical height of boss for a given thickness of sheet stock depends on several dimensional factors . . . Extruded holes may also be used for assembly alignment, reinforcing, bearing and gaging.

◆ **EXTRUDED HOLES** in sheetmetal parts simplify assembly of stamped and machined components. Where screw and nut assemblies are used, this method may permit assembly economy through elimination of the nut. Where screws are used, the extruded hole offers substantially greater holding power than can be attained in the flat sheet.

Holes in the sheetmetal components are often punched and subsequently tapped. In each case, the designer should carefully check the strength of such tapped holes. For steel and brass stampings, stock thickness should be no less than half of the thread diameter. For softer metals, such as aluminum or zinc, stock thickness should be at least  $\frac{2}{3}$  of the thread diameter.

This condition is often difficult to comply with. Increases in stock thickness or use of a large number of small screws may provide a

solution in some cases. Another quite simple solution is the use of flanged, extruded holes.

In this type design the material which is normally punched out is used to form a boss. By this means, the threadable portion of the hole is extended considerably beyond original stock thickness.

Several practical methods are available for forming flanged holes. Simplest and cheapest consists of a pierced hole. It is made with a tool differing somewhat from the design of components for standard perforating tools. The punch-bottom is not flat, but ends in a point-shaped form. The die-opening has a much greater diameter than the punch, and is equal to punch diameter plus 1.3 to 1.7 times stock thickness. Die-opening is straight-walled rather than tapered. Other die parts—stripper, stock-gages, stops—are practically the same as in a standard die.

In operation, the piercing die, contrary to



**SLUG NORMALLY WASTED** in punched hole provides metal to form extruded boss.

#### EDITOR'S NOTE

MR. STRASSER, well-known consultant and author, is presently in charge of tool design for a Chilean manufacturer of electrical and plastic components.

practice with standard dies where there is actual cutting, opens the hole by tearing apart the stock. Consequently, the appearance of the boss is unsatisfactory. It has ragged edges, caused by the tearing action. Where appearance of the boss-edge is important, two solutions are possible. Holes may be extruded with a double-acting punch, or they may be punched and extruded separately.

If the ratio of stock-thickness to hole diameter is sufficiently high, a flat-bottomed, stepped punch with two diameters may be used. A short portion of the punch has a smaller diameter. The body diameter corresponds to the hole diameter. Between the two portions is a smooth streamlined shoulder.

In operation, the punch point punches a small hole in the stock. When the shoulder on the punch reaches the stock, it draws the metal into the die-opening, forming the necessary boss, with clean cut, straight edges.

Where even better appearance is desired, a stepped die may be used. The step in the die trims the edges and at the same time the boss is swaged slightly.

#### To get a better looking boss

If stock-thickness to hole diameter ratio is too high, it is necessary to punch and extrude separately. First a small hole is punched with a standard punching die, then a bullet-nosed punch extrudes the boss in an extruding die.

This latter method gives a longer and better looking boss. Some simple rules must be followed. Punching and embossing must be done from opposite sides, so the punch burr will lay on the side of minimum stress.

In every punched hole the bottom edge is rougher. When expanding or stretching the metal, any roughness is likely to split, thus forming ragged edges. Conversely, if the smoother, top edge is stretched more than the bottom edge, there is less probability of cracking or splitting the metal.

#### Stretch depends on stock, temper

Another method for improving the embossing operation is to shave the punched hole before embossing. This method, however, may be used only where punching and extruding are done separately.

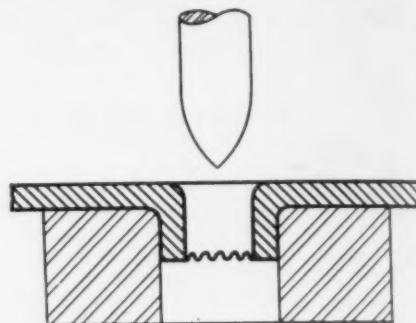
On high-production jobs, punching and extruding may be combined in one operation. The preliminary hole is punched by means of a spring mounted movable bushing-die. After completion of the punching operation, the punch continues to descend and its body extrudes the boss.

In hole-embossing, the wall thickness is always less than the original stock thickness, because the metal is stretched somewhat. The amount of stretch will vary from 20 to 50 pct and depends chiefly on the kind of stock and its temper.

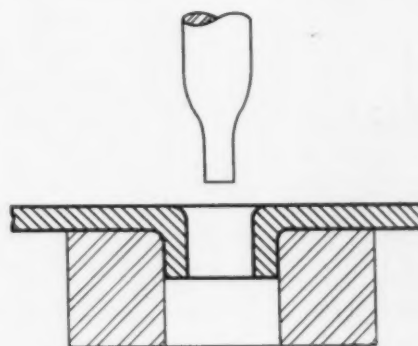
If an extruded boss of longer height is desired, some predrawing or annealing may be necessary prior to performing the extrusion operation.

Predrawing consists briefly in drawing first a proper embossment, by pulling in metal from the outskirts of the hole. Then a hole is punched and finally the hole is completed by extrusion.

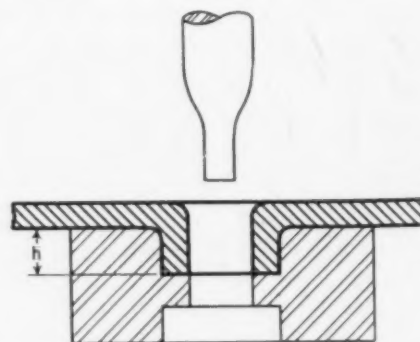
If further reduction in thickness is not objectionable, annealing is applied. The boss is



**SIMPLEST** method is to pierce hole with a bullet-nosed punch in extrusion type die.



**FLAT-BOTTOMED** step punch with two diameters may also be used if stock thickness to hole size ratio is sufficiently large.



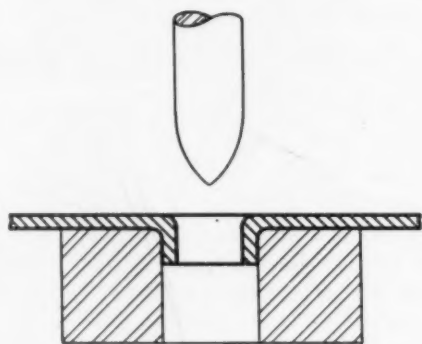
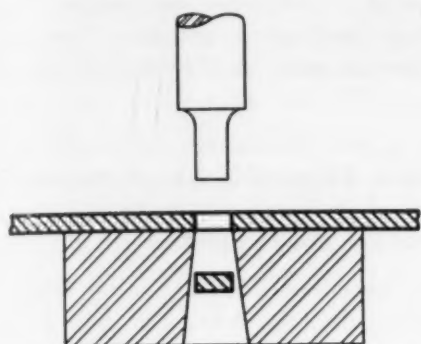
**FOR BETTER APPEARANCE** a stepped die may be used to trim and extrude in one operation.

formed with standard tools and after the work-piece has been annealed, the boss is further extruded. In this way, boss length may be doubled. Wall-thickness becomes half of the original value of the extruded hole.

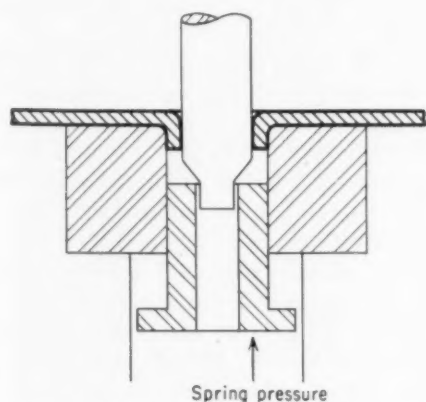
Both methods are slow and expensive and low boss-heights, which can be made directly in one operation, are recommended.

Side advantages to the use of this method for production of holes are obtained. Required

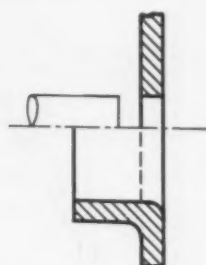
pressure is much less than in the case of ordinary cutting dies. There is less need for a very accurate alignment between punch and corresponding die-opening. An eccentricity of a few thousands of an inch doesn't matter. Die and punch have a longer duration, because of more liberal dimensions between punch and die proper. Also, there are no sharp edges to dull. The rounded edges of holes speed tapping if this operation is used.



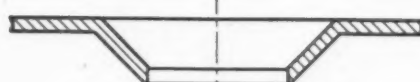
WHERE STOCK THICKNESS to hole diameter ratio is too high, hole is first punched with punching die. Then bullet-nosed punch is used to extrude the boss in an extruding die.



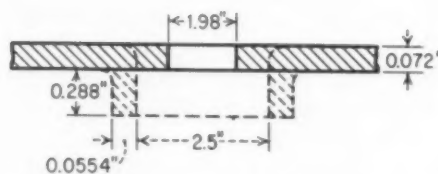
TO CUT COSTS, punching and extruding may be combined in one operation with special dies.



PUNCHING, EMBOSsing done from opposite sides keep burr on side of minimum stress.



PREDRAWING first draws metal in from edge of hole (top). Hole is then punched (center), and, finally (bottom) hole is extruded.



BRASS SHEET, 0.072 in. thick, with 30 pct stretch factor, was used in typical application.

# STRICT GAS CONTROL

## Halts Decarb In Aircraft Tubing



By W. D. Latiano  
Metallurgical Editor

♦ Aircraft specifications set up tight decarburization limits for tubing . . . They're vital and they're hard to meet . . . Michigan Seamless, in a closely controlled operation is meeting these specifications and doing them better in normal tube production . . . Its unusual setup has eliminated the need for carbon restoration.

♦ Secret of this company's success is strict atmosphere carbon control . . . A generated nitrogen gas with about 2.5 pct CO, 2.5 pct H<sub>2</sub> and slight traces of CO<sub>2</sub> is used . . . Some natural gas is added in the furnace, depending on the carbon content of the material being treated.

♦ Car type and continuous process furnaces are included in the setup . . . Greater uniformity of structure within the same tube, from tube to tube, and from lot to lot is claimed.

♦ SEAMLESS AIRCRAFT TUBING with practically no surface carbon loss resulting from annealing or normalizing operations is now being made on a production basis by Michigan Seamless Tube Co., South Lyon, Mich. Carbon losses through decarburization are regularly held below the close requirements of aircraft specifications.

Due to the many heating operations in the production of this product, decarburization has always been difficult to control. Such tubing is usually of light wall construction and requires maximum strength and ductility for given weight. Loss of strength due to a low carbon surface is unacceptable. For this reason aircraft manufacturers have constantly demanded closer decarburization limits but had to accept what the tube producer could make.

By a program of strict atmosphere carbon control Michigan Seamless Tube Co., South Lyon, Mich., is able to hold decarburization to much closer limits than required by present aircraft specifications. This Detroit area company uses a batch type furnace, a continuous furnace, and a large capacity nitrogen generator.

Although specializing in manufacture of high quality aircraft tubing this company also makes a wide variety of seamless tubing in carbon, low and medium alloy grades. Tube diameters to 3 in., and special shapes such as squares, rectangular, ovals, and streamline tubing can be produced without appreciable decarburization. With the present furnace equipment, normalizing, process annealing, annealing for special

structures and stress relief annealing are done in a neutral atmosphere.

How well Michigan Seamless has succeeded in the control of decarburization is shown in the table. These figures are an accumulation of daily checks over a period of several consecutive days. Where any decarburization has resulted it is only partial and of very shallow depth, and much less than allowed by aircraft specifications.

In making tubing, Michigan Seamless buys rounds which are heated, pierced and rolled into seamless tubing. Those to be cold drawn are then pointed. Tubes to be processed on the tube reducing machines are left in the hot-rolled condition. All tubing is given an acid pickle to remove scale which would generate oxygen in the annealing operation and upset the atmosphere balance.

After annealing in either the batch or continuous atmosphere furnaces the tubing is given a light pickle. Drawing compound is applied and the tubing is ready for cold drawing or processing on the tube reducing machines. In cases of light and small sizes of aircraft tubing as many as 12 cold draw passes each with intermediate anneal are necessary. These successive anneals, necessary in the production of aircraft tubing, add considerably to the danger of excessive decarburization.

Previous to the last cold drawing operation or after the last cold draw pass, aircraft tubing may be normalized to refine the grain structure and increase tensile strength. Or, a low temperature anneal may be necessary to lower tensile and add ductility depending on final

physical requirements. If strength beyond standard specifications is required, two or more cold draw passes are made without intermediate anneal to obtain desired physical properties for the particular steel grade. Special microstructures can be obtained by a combination of program or cycle anneal, normalizing, varying degrees of cold work and low temperature anneals.

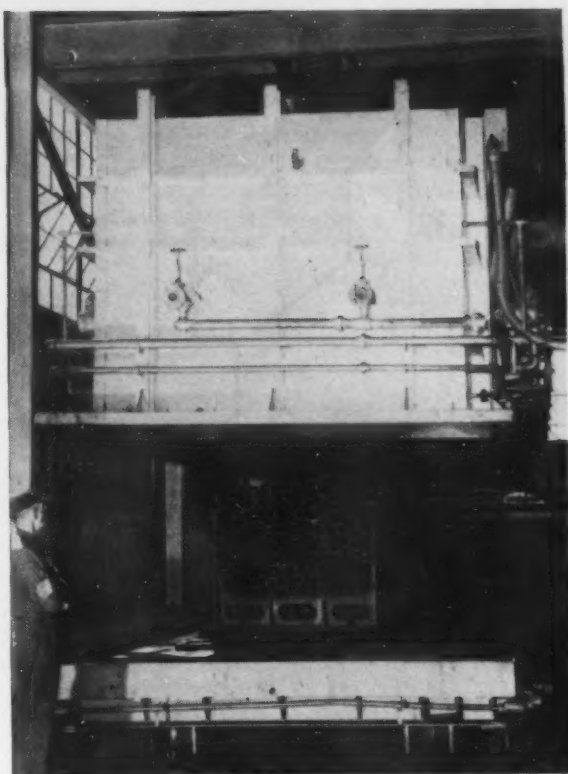
Heat treating for structure, stress relief anneal and process annealing are done in a batch type furnace at Michigan Seamless. This furnace, built by the Lee Wilson Engineering Co., is radiantly heated with 16 "O" type units equipped with dual pressure burners. The unit is 42 in. wide, 36 in. high, and 42 ft long and will handle a 30,000-lb charge.

### Furnace controls improve quality

A turbo-type air blower, combination gas-air proportional control valve with drive motor, master control cabinet and other necessary equipment are included. Eight reversing fans in the furnace roof uniformly circulate and control 2000 cfh of atmosphere gas. Two refractory lined, car type annealing bases are used. A double seal, one of sand and one of oil assure against atmosphere leakage.

Cars are linked together so that as one car is pulled out of the furnace a second loaded car is in position under the bell. This arrangement requires use of only one drive mechanism for both cars.

The temperature control system contributes greatly to the quality of the product of this furnace. Eight timing devices and two Leeds & Northrup model "S" indicating recorders are used. One instrument controls furnace temperature and the other monitors the furnace



ONE OUT AND ONE UNDER is the system used for loading and unloading tubing in this Lee Wilson batch type furnace. Cars are linked.

charge through six thermocouples located at various points in the load.

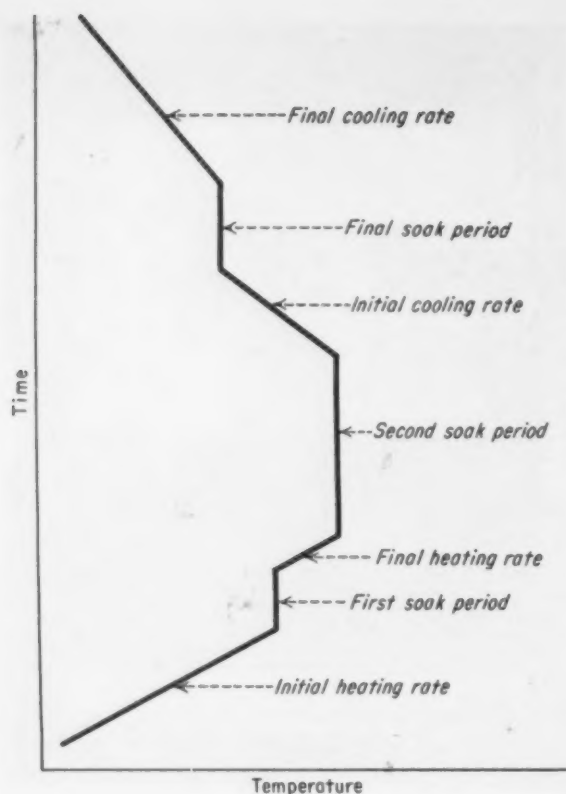
Atmosphere is checked with an Alinor dew-pointer and the purging of the furnace is checked with a Ranarex specific gravity indicator-recorder. After a furnace load is changed the air must be purged from the furnace. At

TABLE

### PRODUCT CHECK FOR DECARB. VS. SPECIFICATION

Sample Number	Wall Thickness in in.	Outside Diameter				Inside Diameter			O.D. & I.D.	
		Actual Decarburization			Allowable Decarb. O.D.	Actual Decarburization			Actual Decarb.	Allowable Decarb.
		Complete	Partial	Total		Complete	Partial	Total		
1	0.028	0	0	0	0.008	0	0	0	0	0.010
2	0.035	0	0	0	0.008	0	0	0	0	0.010
3	0.035	0	0	0	0.008	0	0	0	0	0.010
4	0.035	0	0	0	0.008	0	0	0	0	0.010
5	0.035	0	0	0	0.008	0	0	0	0	0.010
6	0.049	0	0	0	0.009	0	0	0	0	0.012
7	0.049	0	0	0	0.009	0	0	0	0	0.012
8	0.049	0	0	0	0.009	0	0	0	0	0.012
9	0.058	0	0.002	0.002	0.011	0	0	0	0.002	0.014
10	0.065	0	0	0	0.011	0	0	0	0	0.014
11	0.065	0	0.002	0.002	0.011	0	0.003	0.003	0.005	0.014
12	0.079	0	0.002	0.002	0.012	0	0.003	0.003	0.005	0.016
13	0.083	0	0	0	0.014	0	0	0	0	0.018
14	0.083	0	0	0	0.014	0	0.002	0.002	0.002	0.018
15	0.083	0	0.003	0.003	0.012	0	0	0	0.003	0.016
16	0.083	0	0	0	0.012	0	0	0	0	0.016
17	0.095	0	0.005	0.005	0.015	0	0	0	0.005	0.020
18	0.109	0	0	0	0.017	0	0	0	0	0.022
19	0.109	0.002	0.003	0.005	0.017	0	0	0	0.005	0.022
20	0.109	0	0	0	0.017	0	0	0	0	0.022
21	0.109	0	0	0	0.017	0	0.002	0.002	0.002	0.022
22	0.120	0	0	0	0.017	0	0	0	0	0.022
23	0.156	0	0.005	0.005	0.020	0	0.005	0.005	0.010	0.026
24	0.156	0	0	0	0.020	0	0	0	0	0.026
25	0.185	0	0.005	0.005	0.020	0	0.003	0.003	0.008	0.026
26	0.188	0	0	0	0.020	0	0	0	0	0.026
27	0.250	0	0	0	0.025	0	0.002	0.002	0.002	0.037

Note: The depth of complete decarb. cannot exceed half the allowable total decarb. (Aircraft Spec.)



TYPICAL HEATING AND COOLING, based on time-temperature, for automatic annealing cycle.

GAS QUENCH plays important part in close control of decarburization in aircraft tubing produced at Michigan Seamless. Material can be quenched from 1750F to a black heat in 30 to 60 seconds.

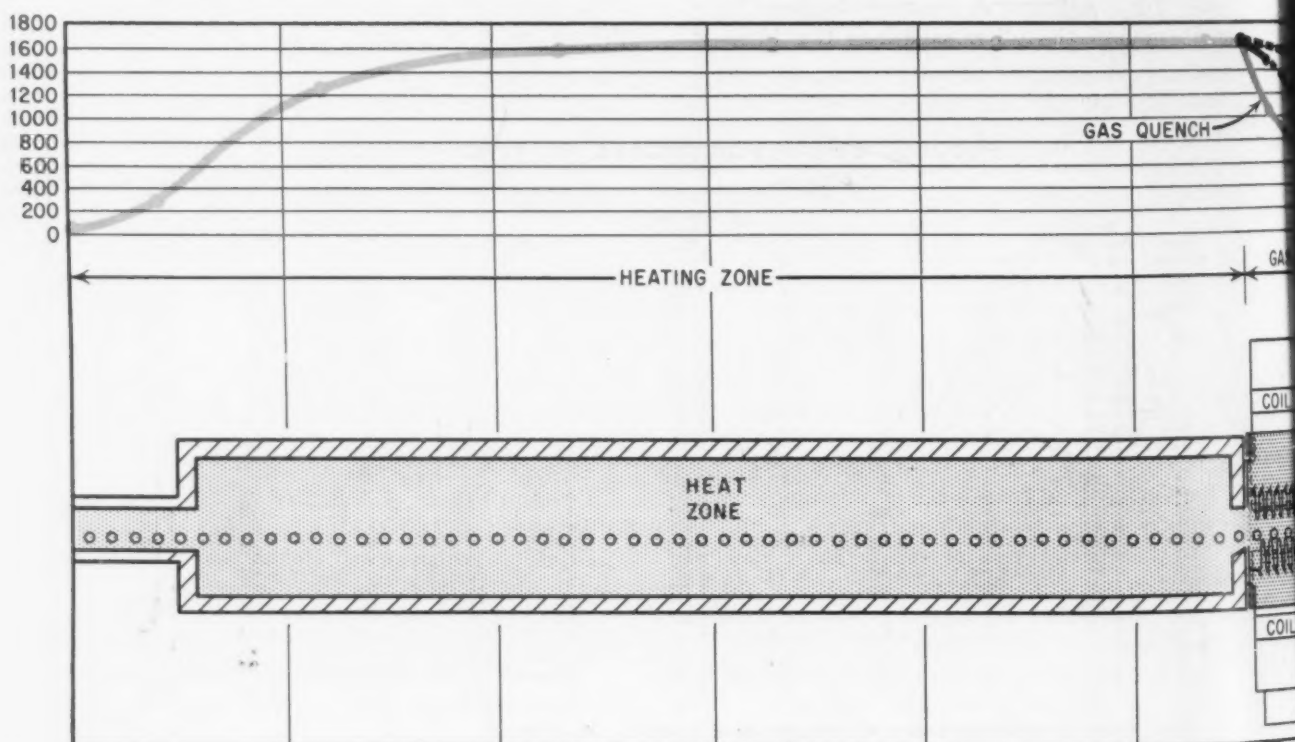
regular intervals the specific gravity of the atmosphere in the furnace is checked against that of the generator gas. When the furnace atmosphere and the generator gas are within established limits the furnace is ready for application of heat. The entire operation is controlled from a central panel.

Annealing cycle in this furnace can be completely automatic. For example, a typical annealing cycle for a certain microstructure might include: (1) Heat to 1450 F at 100 F per hour. (2) Then heat to 1550 F at 50 F per hour. (3) Hold at this temperature for 4 hours. (4) Then cool to 1400 F at 100 F per hour. (5) Cool to 1000 F at 10 F per hour.

### Controls operate cycle automatically

By setting the various timers and control instruments the furnace will operate through the cycle automatically. Since heats in the batch furnace take from 10 to 36 hours, a small pilot furnace is used to permit accelerated studies of gas mixtures required for various steels and to determine cycles for the different structures. The pilot furnace is electrically heated and has a 2.1 cu ft chamber with all the control features of the large production unit.

Normalizing is done in the continuous furnace built by Surface Combustion Corp. Much of the stress and process annealing is also done in this unit. The radiantly heated furnace has a 4-compartment heating zone 30 ft long and a cooling section 48 ft long. Two fan and refrigerator equipped cooling chambers are located at the beginning of the cooling zone. One is placed above the cooling conveyor, the other on the floor below the conveyor. General layout of the nor-



malizing unit is shown in the drawing below.

Efficient normalizing is accomplished by passing cooled nitrogen atmosphere from the cooling chambers through the load as it passes from the hot zone to the cooling zone. The fact that the tubes are not in a dense load at this point but are uniformly spaced in a single layer adds to the uniformity of the structure. Tubes are transported through the furnace on a series of rollers. Loading and unloading is accomplished by roller conveyors which are level with the furnace.

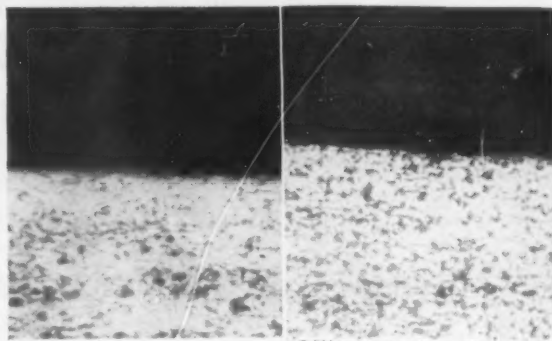
Michigan Seamless uses nitrogen gas with a certain amount of added natural gas to make up the atmosphere in nearly all of its annealing operations on aircraft and similar alloys. The nitrogen gas, made in a 10,000 cfm generator built by Gas Atmospheres Inc., is produced by burning natural gas in a slight deficiency of air. Most water vapor is removed by condensation in a gas precooler. After cooling, the gas passes through a chemical absorber monoethanolamine (Mea) which removes carbon dioxide. It then is successfully passed through a refrigerator and an alumina dryer to further lower water vapor content. Dew points as low as  $-50^{\circ}\text{F}$  are obtained.

#### Reboiler strips solution of $\text{CO}_2$

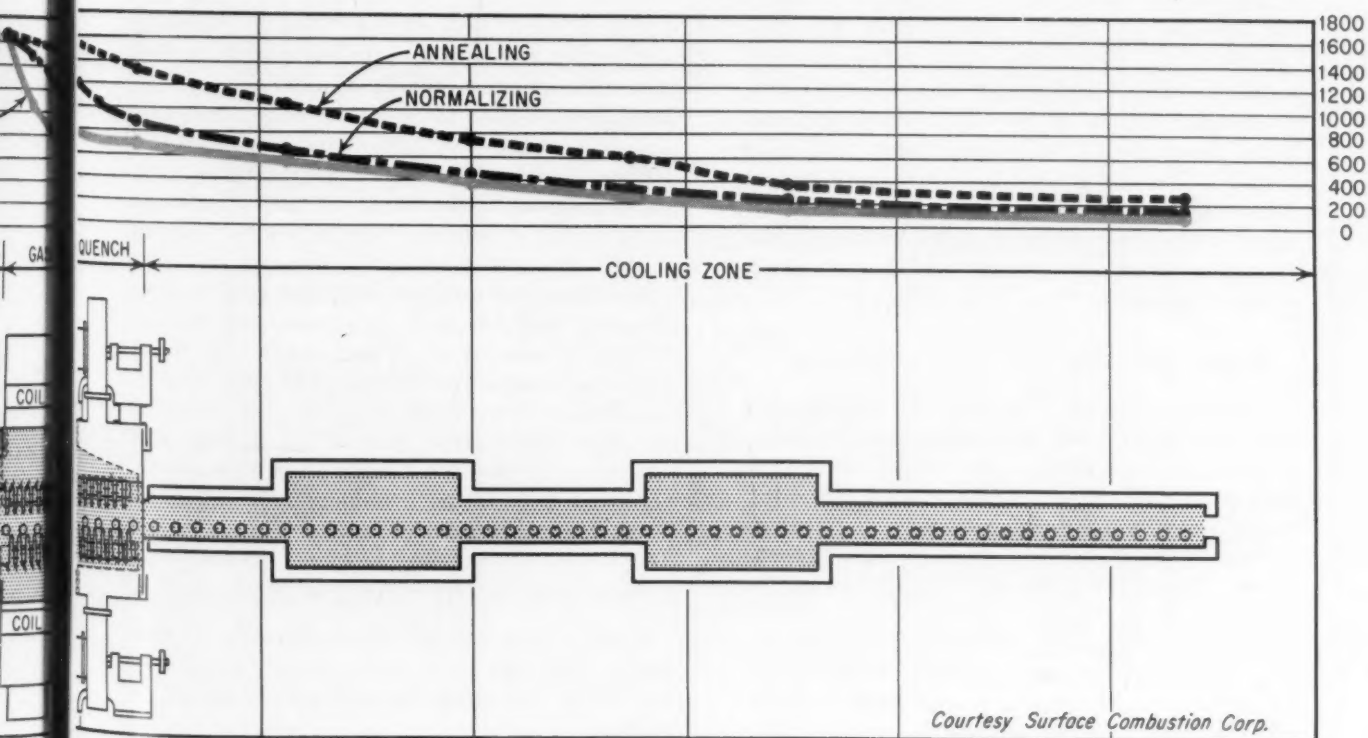
The generator also contains a recirculating system for the Mea. This chemical absorbs carbon dioxide at low temperatures and gives it up at higher temperatures. By use of a reboiler the solution is stripped of carbon dioxide and returned to the absorber tank to be used over again. Only slight additions are needed from time to time for makeup of solution.

Atmosphere from the generator is essentially nitrogen with approximately 2.5 pct  $\text{CO}$ , 2.5 pct  $\text{H}_2$  and slight traces of  $\text{CO}_2$ . To attain certain carbon potentials natural gas is added in the furnace at times depending on the carbon content of the material being treated. Addition of natural gas is closely controlled to prevent an over-addition which would cause a build-up of soot on the work.

The process of carbon control at Michigan Seamless is one of retention of carbon instead of restoration. This company claims that aircraft tubing processed and shipped with the original carbon is more uniform in structure. The percentage of carbon throughout wall thickness, from end to end of each tube, between tubes in each lot and from lot to lot is also more uniform.



SAMPLE of 4140 steel with 0.005 in. partial decarburization on the surface, is shown at left. X 100. Micrograph of 4130 steel after annealing. Uniform structure was maintained. X 100.



Courtesy Surface Combustion Corp.

# HOW MACHINABLE



By E. A. Loria

Senior Engineer, Metallurgy  
Research and Development Dept.  
The Carborundum Corp.  
Niagara Falls, N. Y.

◆ Here's a guide to the selection and machining of nodular, malleable and gray cast irons . . . Based on constant-pressure lathe tests, and correlated with physical properties of the materials, this guide can be put to work in your plant . . . Machinability ratings are based on an index of 100 for standard cold-drawn B1112 steel.

◆ Machinability of the nodular irons is improved considerably by annealing at 1650F . . . Decreasing ductility, indicating presence of weak and embrittling constituents, may be a key to machinability.

◆ For the gray irons there is a good correlation between tensile strength and constant pressure index . . . Samples were iron melted in conventional acid-lined cupolas.

◆ **RELATIVE MACHINABILITY** of nodular, malleable and gray cast irons, correlated directly with mechanical properties, provides a useful guide for the selection and processing of these materials. Such an evaluation has been provided in a study using the constant-pressure lathe developed by Battelle Memorial Institute.

Samples of all three types were obtained from iron melted in conventional acid-lined cupolas. The metal used to cast machining test bars was also poured into standard tensile test bars. Nodulizing of the graphite in the ductile irons was produced by ladle addition of nickel-magnesium alloy.

## How the Tests Were Made

The constant pressure lathe test provides an excellent method for evaluating machinability. It gives information on tool travel for a constant feed load. Even in free-cutting cast iron, specimens of different machining quality cut at different rates, for constant surface speed, when a fixed lateral pressure is applied to the tool.

Ratings are based on the assumption that an iron with superior machinability will cut with a heavier feed than one of poorer machinability when a fixed pressure is used to produce tool

travel. The constant-pressure test ratings agree with tool life results, even though no tool wear occurs in the fixed-pressure lathe test.

In the test, 2-in. turning cuts on round bars are made with the same tool. Thrust pressure is applied by a weight and pulley system. A cam-operated counter records spindle revolutions. Readings are used to calculate feeds or machinability ratings, the latter being based on a standard cold-drawn B1112 steel with an arbitrary machinability rating of 100. Tests are made on the standard at the beginning and end of cuts on a group of test bars.

Machinability ratings are based on results obtained with five tools to compensate for unintentional variations in tool conditions. Tests were standardized at 32 fpm (140 rpm) with a tool thrust of 81 lb for a 1/8 in. deep turning cut. High speed tools with 12° side relief and side rake angles were used. Test specimens were cast bars 1.2 in. in diameter machined to 1.0 in. concentric rounds before testing.

## How the Samples Compared

Analysis and tensile test properties of the sample irons are given in the table. Shows corresponding machinability ratings and hardness readings.

# ARE THE CAST IRONS?

Tensile test properties of the nodular irons are far above those for malleable or gray iron irrespective of chemical analysis. Results for annealed test bars are typical of those obtained in best industry practice. Malleable iron results are somewhat superior to grade B specification for yield strength whereas the gray iron results cover a wide range of tensile strength values in accordance with variations in carbon and silicon.

The annealed nodular irons are as machinable as the gray irons of similar carbon and silicon contents. In some cases they compare well with gray irons of much higher carbon and silicon content and even approach the ratings for grade B malleable irons. Coefficients of variation were greater than those for steel samples. The heavily graphitized gray irons showed least variation in test results.

## Rating the Nodular Irons

Average rating (87) for the as-cast nodular irons is better than those obtained in 1 in. rounds of SAE 1020 or SAE 1030 steels (70 and 65 respectively). They are comparable to Bessemer free-cutting B1111 steel which has an average index of 90 and contains 0.11 pct S, 0.10 pct C and 0.87 pct Mn. The reference standard B1112 steel has 0.20 pct S, the rest of the analysis being the same.

Ratings for the nodular irons are improved considerably by annealing at 1650°F. This changes the matrix from pearlite to ferrite. The malleable irons have the highest ratings for the three types of iron. This was expected because of the absence of combined carbon and the abundance of large patches of scrawly temper carbon in the ferritic matrix.

## COMPOSITION, TENSILE PROPERTIES AND MACHINABILITY RATINGS

Number	Chemical Compositions, Pct								Tensile Test Properties*			Brinell Hardness		Average Machinability Index	Coefficient of Variation	
	TC	Si	Mn	S	P	Ni	Mg	Cu	Ultimate	Yield	Elong.	Edge†	Center		Units	Pct
ANNEALED NODULAR IRONS																
1	3.08	2.27	0.33	0.021	0.068	1.04	0.13	0.06	74950	58950	16	181	184	136	19.1	14.1
2	3.00	2.55	0.50	0.020	0.100	1.01	0.13	0.08	75400	58500	13	199	196	135	23.2	17.1
3	3.18	2.34	0.31	0.018	0.068	1.11	0.12	0.07	74950	56450	16	185	203	142	33.5	23.6
4	3.15	2.48	0.46	0.021	0.114	1.04	0.15	0.06	76600	59950	19	181	192	138	27.0	19.8
5	3.42	1.84	0.30	0.015	0.058	1.64	0.12	0.08	74500	53800	19	177	183	152	29.7	19.6
6	3.12	2.33	0.23	0.015	0.048	1.62	0.13	0.08	75850	55800	18	177	179	166	33.6	20.2
7	3.30	2.10	0.28	0.015	0.043	1.40	0.11	0.06	68850	50200	15	177	173	155	21.2	13.7
8	3.60	2.37	0.36	0.023	0.059	1.49	0.15	0.08	75300	56900	18	181	179	144	24.6	17.0
AS-CAST NODULAR IRON																
1	3.08	2.27	0.33	0.021	0.068	1.04	0.13	0.06	.....	.....	.....	293	293	94	15.6	16.6
2	3.00	2.55	0.50	0.020	0.100	1.01	0.13	0.08	.....	.....	.....	302	300	84	10.3	12.2
3	3.18	2.34	0.31	0.018	0.068	1.11	0.12	0.07	.....	.....	.....	293	293	92	12.5	13.6
4	3.15	2.48	0.46	0.021	0.114	1.04	0.15	0.06	.....	.....	.....	311	302	79	11.1	14.0
MALLEABLE IRONS																
2	3.19	0.89	0.45	0.09	0.14	.....	.....	.....	42550	35700	7	143	143	181	24.2	13.4
4	3.09	1.02	0.41	0.10	0.16	.....	.....	.....	43600	36250	6	131	128	182	27.6	15.2
6	3.05	0.94	0.40	0.09	0.12	.....	.....	.....	45000	37100	7	131	128	186	25.4	13.7
GRAY IRONS																
1	3.36	2.00	0.54	0.12	0.12	.....	.....	.....	34100	.....	.....	207	202	148	10.7	7.2
2	3.30	1.99	0.51	0.14	0.12	.....	.....	.....	32000	.....	.....	207	202	145	10.5	7.1
3	3.38	2.18	0.49	0.15	0.13	.....	.....	.....	30150	.....	.....	179	156	162	7.3	4.5
4	3.25	2.01	0.46	0.13	0.11	.....	.....	.....	34200	.....	.....	187	183	139	13.2	9.5
5	3.19	2.00	0.48	0.12	0.11	.....	.....	.....	39200	.....	.....	197	197	134	13.7	10.3
6	3.27	2.01	0.45	0.13	0.12	.....	.....	.....	35800	.....	.....	197	192	138	15.2	11.0
7	3.23	2.31	0.53	0.11	0.12	.....	.....	.....	30250	.....	.....	177	174	150	16.7	11.1
8	3.20	2.47	0.55	0.11	0.13	.....	.....	.....	29300	.....	.....	179	174	147	14.5	9.9
9	3.23	2.00	0.48	0.14	0.12	.....	.....	.....	36100	.....	.....	197	197	138	12.0	6.7
10	3.26	2.06	0.50	0.11	0.10	.....	.....	.....	35600	.....	.....	187	183	140	12.6	9.0
11	3.35	2.11	0.46	0.11	0.12	.....	.....	.....	33100	.....	.....	187	187	140	11.4	8.1
12	3.26	1.89	0.52	0.13	0.12	.....	.....	.....	37200	.....	.....	197	192	135	12.2	9.0
13	3.63	2.09	0.85	0.09	0.11	.....	.....	.....	21200	.....	.....	179	157	180	16.1	10.1
14	3.55	2.14	0.85	0.09	0.10	.....	.....	.....	24800	.....	.....	189	180	145	12.6	8.6
15	3.27	1.93	0.89	0.09	0.11	.....	.....	.....	38400	.....	.....	229	216	124	9.7	7.8
16	3.66	2.21	0.84	0.08	0.10	.....	.....	.....	20100	.....	.....	165	158	172	18.9	11.0
17	3.54	2.23	0.82	0.09	0.10	.....	.....	.....	24250	.....	.....	181	174	150	14.8	9.9
18	3.28	1.96	0.87	0.08	0.11	.....	.....	.....	38300	.....	.....	214	215	127	12.5	9.6

\* Nodular irons: 0.505 in. diam bars, machined from cast keel blocks.

Malleable irons: As cast 0.625 in. diam bars.

Gray irons: 0.800 in. diam bars, machined from cast 1 1/4 in. diam bars.

† Edge hardness taken around 1/4 in. below as-cast surface of 1 1/4 in. diam bar.

Actually in general area where machining tests were made since bars were first turned down to 1 in. rounds before testing.

**"Fully annealed nodular iron may be considered as pure ferrite, modified by elements present."**

Most of the gray iron samples tested were found to have fairly high indexes of machinability. Results are controlled principally by the amount of combined carbon or free ferrite in the microstructure. Variations would be expected because of different carbon and silicon contents. Study<sup>1</sup> of a number of such gray irons showed total carbon rather than silicon content is the controlling variable producing a change in constant pressure rating.

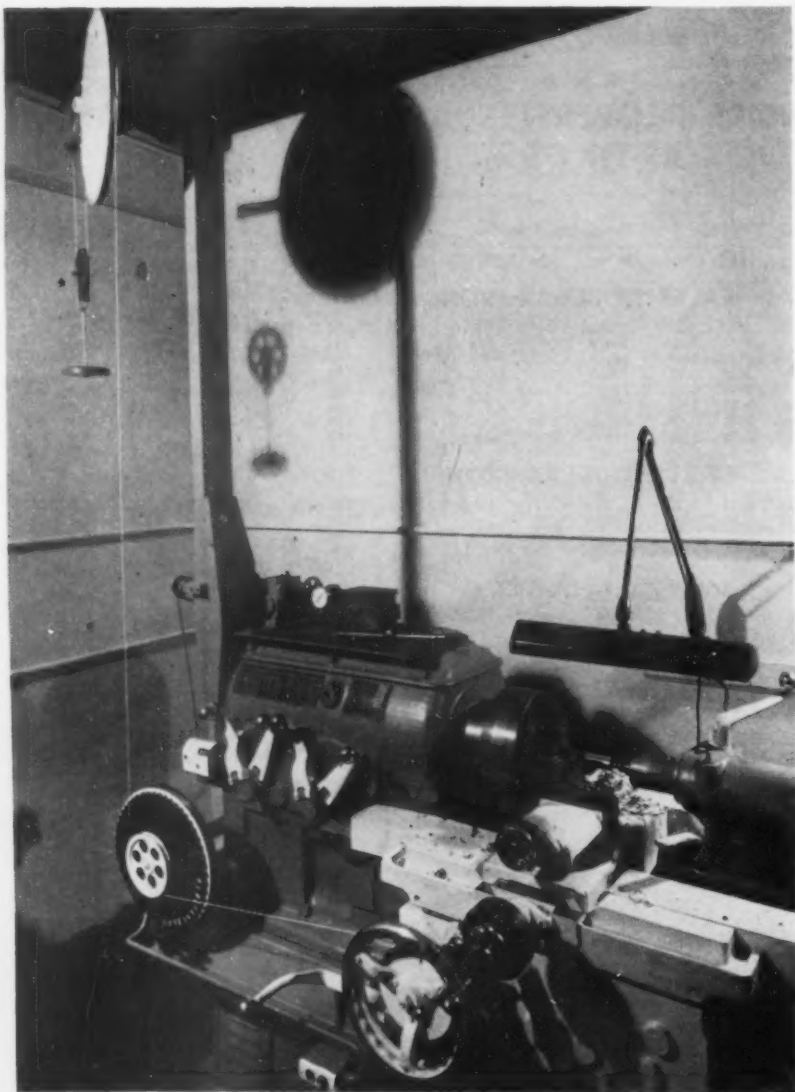
A comparison of individual nodular iron results indicates ferrite strengthening and decreasing ductility may have affected machinability ratings. Currently, low alloy nodular iron is most widely used in the annealed, ferritic condition. Nodular iron can take full advantage of properties obtainable by solid solution hardening of ferrite.

Fully annealed nodular iron may be considered as pure ferrite, modified by the elements present. Carbon disperses many graphite nodules through the ferrite matrix, thereby weakening it. The ferrite is further modified or strengthened by silicon, manganese and nickel. This again tends to lower machinability.

### **Ductility Key to Machinability**

Decreasing ductility may be another indication of better machinability since it indicates the presence of more weak or embrittling constituents. These tend to interrupt continuity of the ductile matrix and facilitate chip removal. Good machinability appears to be associated with an optimum hardness and brittleness level which depends on composition and heat treatment.

Variations in these elements producing different degrees of ferrite strengthening may be responsible for the different constant-pressure ratings. In the table, comparing iron 4 with iron 5, the lower manganese content of the latter is associated with a higher index. The



CONSTANT-PRESSURE LATHE developed by Battelle Memorial Institute, previously used to test machinability of steels, was used for these studies.

higher indexes of irons 5, 6, and 7 appear to correlate with their lower manganese constant.

More data is required on the effect of silicon although, based on a comparison of irons 3 with 4 and 6 with 8, a lower index was obtained with a higher silicon content. Differing manganese contents of these irons, however, mask the effect of silicon. Combined effect of Si and Mn strengthens the ferrite matrix and lowers machinability. Together they increase pearlite hardenability in the as-cast nodular iron bars and lower machinability as shown in results for irons 1 to 4. The importance of changing the matrix structure from pearlite to ferrite to improve machinability is apparent in a comparison of results for these four irons in the as-cast vs. annealed state.

### Lower hardness gives higher rating

For the nodular irons, the correlation of higher constant-pressure ratings with lower tensile strength or ductility values is not clear cut. More data is required for clarification. For the gray irons, there is a good correlation between tensile strength and the constant-pressure index, with the latter increasing as the former decreases. Usually, tensile properties, as determined under normal testing conditions do not reliably indicate machining qualities. Any such correlation would have to depend upon the mechanical properties being determined under the high rates of strain found in any machining operation. A rough correlation between room-temperature hardness and machinability does appear for both nodular and gray iron. Higher ratings are obtained in irons of lower hardness.

Gray iron microstructures have revealed that the higher carbon equivalent irons having the higher constant-pressure ratings also had a higher percentage of free ferrite associated with the customary pearlite matrix. Differences in chemistry producing more complete graphitization and hence larger amounts of free ferrite accounted, in most part, for the higher ratings. Primary carbide particles and a finer pearlite structure, were responsible for lower ratings in some irons.

## What Part Does Graphite Play

No correlation between constant pressure-ratings and the graphite part of the microstructure was found in gray iron. Amount of graphite appears to be a factor only when comparing irons of widely different carbon content. But a significant difference in the matrix structure occurs simultaneously so that it is difficult, if not impossible, to separate the two variables. Graphite does produce a lubricating action which lowers friction on the cutting tool.

Discontinuity contributed by the graphite

**"Graphite in the nodular irons was smaller, more numerous and more evenly distributed . . ."**

flakes gives rise to zero elongation (ductility) and establishes the mechanism of cutting peculiar to gray iron. Its effect seems to end there since all shapes and sizes of graphite in quantities normally found in gray iron result in zero elongation. In malleable and nodular irons where the elongation is different from zero, the influence of graphite may be different. It appeared worthwhile to study the graphite size and density variations in the two spherulitic types of iron as another possible explanation for the different machinability ratings. Previous work<sup>2</sup> has shown that the constant-pressure machinability index of Bessemer free-cutting steel appears to be affected by the size, shape and number of sulfide inclusions.

### Nodular irons have higher strength

Graphite sizes of all the nodular irons averaged between 0.03 and 0.05 mm, with maximum diameter between 0.05 and 0.08 mm. For the malleable irons, the average size was 0.15 to 0.25 mm, roughly three times the diameter of largest graphite particles in nodular irons.

Little or no difference in graphite density (number) appeared among the nodular irons. No correlation between nodule size or density and machinability could be found which supports the initial possibility that different constant-pressure indexes were produced by the matrix rather than graphite structure.

Graphite in the nodular irons was smaller, more numerous and more evenly distributed than in the malleable irons. The latter must have grown at high temperature for it appeared as large, scrawly patches, unevenly distributed. However, these crab-like patches of temper carbon tend to promote machinability. These particles, in their effect on mechanical and machining properties, are about equal to the carbon which would be needed to fill the space occupied by the existing graphite and the iron it encloses. Nodular irons have, however, a higher yield strength and elongation, and a greater degree of pressure tightness. Discontinuity paths through the scrawly temper carbon of the malleable irons might permit some leakage in castings subjected to pneumatic or hydraulic pressure.

### References

<sup>1</sup> E. A. Loria, F. W. Boulger and H. L. Shaw, What Constituents Affect Machinability of Gray Irons, American Machinist, Vol. 96, 1952, p. 122.

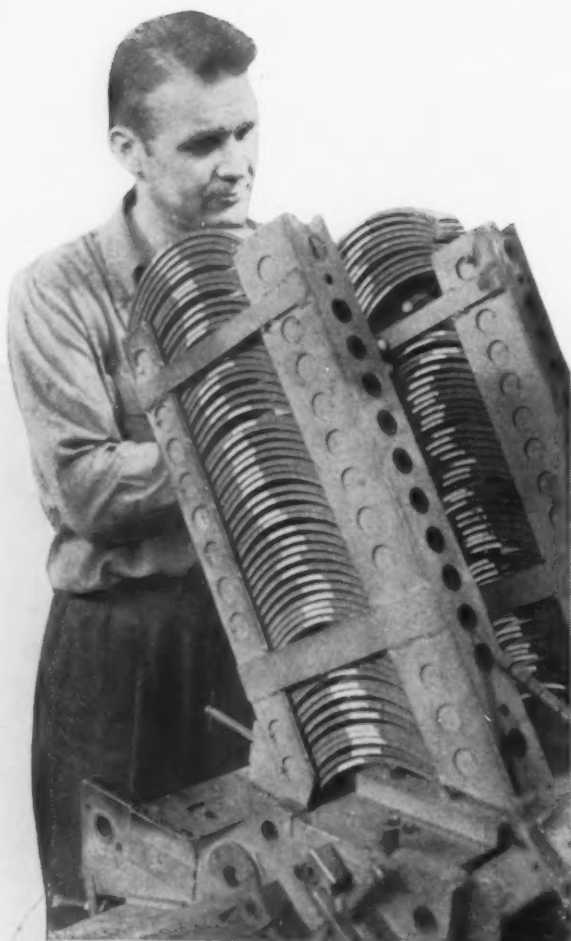
<sup>2</sup> F. W. Boulger, H. A. Moorhead and T. M. Garvey, Superior Machinability of MX Explained, Iron Age, May 17, 1951, p. 90.

One a second—

# New Processing Setup BONDS BRAKE LININGS FASTER



By W. G. Patton  
Assistant Technical Editor



**WIRE BRUSHING** of brake linings removes dust and molding compound for better bonding. The linings are fed by rubber rolls.

◆ Conveyors, furnaces, applicators and other equipment have been set up methodically at Chrysler's Lynch Road plant for bonding linings to brake shoes on a mass-production scale . . . Continuous processing produces Cycleweld-bonded shoes at the rate of one per second.

◆ Three 100-ft long furnaces—two with five conveyor lines and one with two—cure the cement as the shoes pass through . . . Several types and sizes of brake shoes can be cured simultaneously in one furnace . . . All of Chrysler's brake-shoe requirements can now be supplied from this one plant.



**CEMENT** from 100-gal pressurized vessels is fed to this machine which applies it to linings through tooth-shaped nozzles.

♦ **BONDING MATERIAL**, called Cycleweld cement, has exceptional properties. Since its development by Chrysler Corp. more than 10 years ago, engineers have learned to apply this material using mass production methods. As a result, the Lynch Road plant can now produce enough wheel and transmission brake shoes to supply all Chrysler car and truck divisions throughout the country.

Steel brake shoes with Cycleweld-bonded brake linings emerge from three 100-ft long furnaces at the rate of one per second. Five continuous conveyor lines run through the two largest curing furnaces. The third furnace has two continuous conveyors running through it. Several types and sizes of brake shoes can be cured simultaneously in the same furnace.

Application of Cycleweld cement is entirely automatic. After passing through drying ovens, a brake lining and shoe are inserted in a special aluminum fixture which adjusts itself automatically to maintain uniform pressure during the entire curing operation. A special device unclamps the brake shoes, simplifying removal of the assembled brake shoe from the conveyor lines.

#### **Flexibility designed into setups**

Considerable flexibility had to be designed into the Cycleweld-bonding setup. Including automatic transmissions, the cement bonding line must accommodate brake segments used in drums ranging in diameter from 7 to 16 in.

Chrysler-built passenger cars use 10 to 12-in. diam brake drums. The lining is 2 in. wide. Truck brake drums, however, range from 10 to

16 in. The lining width varies from 1¾ to 3½ in.

Brake shoes are made from hot-rolled T-shape steel in lengths up to 20 ft. Length of the steel strip is always a multiple of the steel required for the shoe. After cutting to length, the steel is trimmed and pierced. The next operation is rolling to shape on a Yoder machine. All trimming and bending operations are performed while the steel is cold.

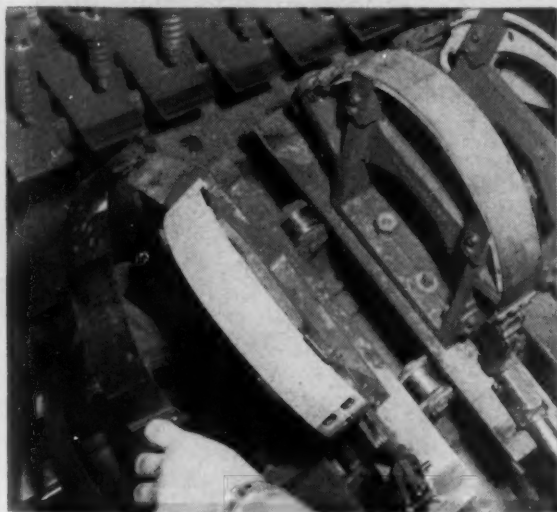
#### **Shoes Bonderized after dipping**

Following piercing and forming, the steel moves by conveyor through a two-stage, spray-type washer. After dipping in an alkaline cleaner and pickling, shoes are Bonderized. A chemically clean metal surface is necessary to insure proper bonding of the lining to the shoe.

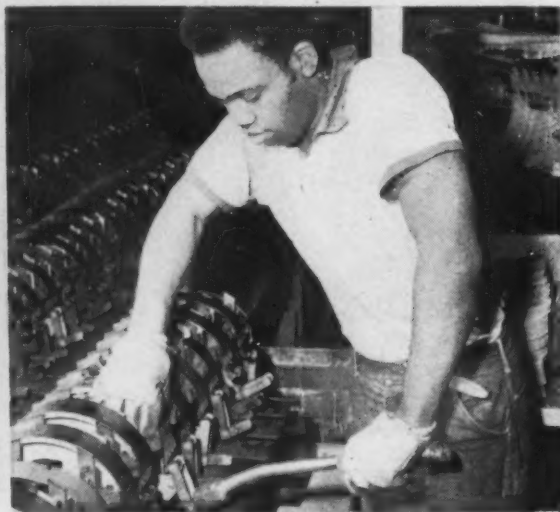
Brake linings also require a cleaning operation before the cement is applied. After removal from shipping cases, all linings are wire brushed in a specially designed machine. Rubber feeder rolls deliver the linings to a wire brush rotating at approximately 1380 rpm. Both dust and loose molding compound are removed during this operation. Woven and molded types of brake lining are used.

Cycleweld cement is applied continuously in a machine developed for this operation. The cement is held in 100-gal pressurized vessels and fed under pressure to tooth-shaped nozzles which apply the cement to the brake lining. Linings are roller-fed continuously at a rate of 47 sfpm.

After applying bonding cement as two continuous ribbons, the parts are delivered to a belt conveyor where an operator removes the



**LININGS** are held in place during and after the curing treatment by spring-loaded steel strips. Spring pressure is adjusted to 35 ft.-lb.



**QUICK CLAMPING** of the steel band is done with a special wrench. The line stops automatically if clamp is not positioned properly.

parts and transfers them to a chain conveyor.

Five applicators are used to meet production requirements. Several of these machines are for one type and size of brake shoe, an example being the applicator for the small 7-in. transmission brake shoe. The contour of the applicator assures uniform application of cement across the two cemented areas of the lining.

Following application of the cement, linings pass through steam-heated ovens to evaporate the inflammable solvent in the cement. The temperature for this operation is 180°F. Exhaust fumes are carried out the stacks. When linings are dry, they are transferred to a pallet-type conveyor. Bonderized brake shoes are transferred to the same conveyor at another transfer station.

#### Spring provides uniform pressure

Linings removed from the conveyor are properly positioned on the shoes and inserted in an aluminum fixture. A steel strip, attached to a calibrated spring, is clamped over the lining. Torque applied to the hold-down strap is approximately 35 ft-lb which is equivalent to a 150-psi pressure on the lining. Torque is checked each week.

The operator uses a wrench to lock the cam-type over-center clamp. The spring attached to the steel hold-down band provides uniform follow-up pressure regardless of expansion in the curing furnace. Brake shoe assemblies, securely held by the fixtures, are carried through the 100-ft furnace on endless conveyors.

A safety device, located in front of the furnace, checks the position of each clamp on the conveyor. If the clamp is not in proper posi-

tion, the line stops and an alarm warns the operator.

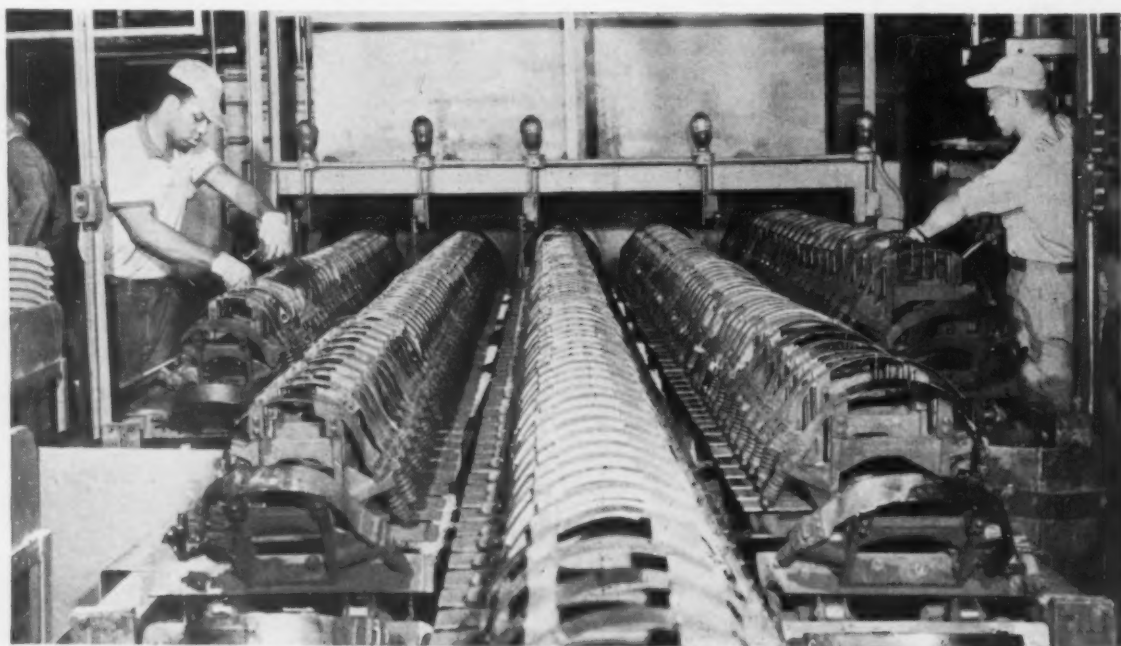
The heating chamber of the furnace is approximately 60 ft long and has a 20-ft cooling chamber. Temperature of the interface between the lining and the shoe is held at about 350°F for a minimum time of 20 min.

An automatic kick-off device disengages the clamp as the brake shoes leave the furnace. The fixture is then unloaded onto a conveyor.

Following inspection, the exposed surface of the steel is painted with a fast-drying lacquer which is dried in an oven. Ex-Cell-O grinding heads, adapted for the purpose, grind the lining surface to  $\pm 0.0035$  in.



**KICK-OFF DEVICE** disengages as the brake shoes leave the furnace. Before leaving the furnace, brake shoes pass through a 20-ft cooling furnace after being held at 350°F.

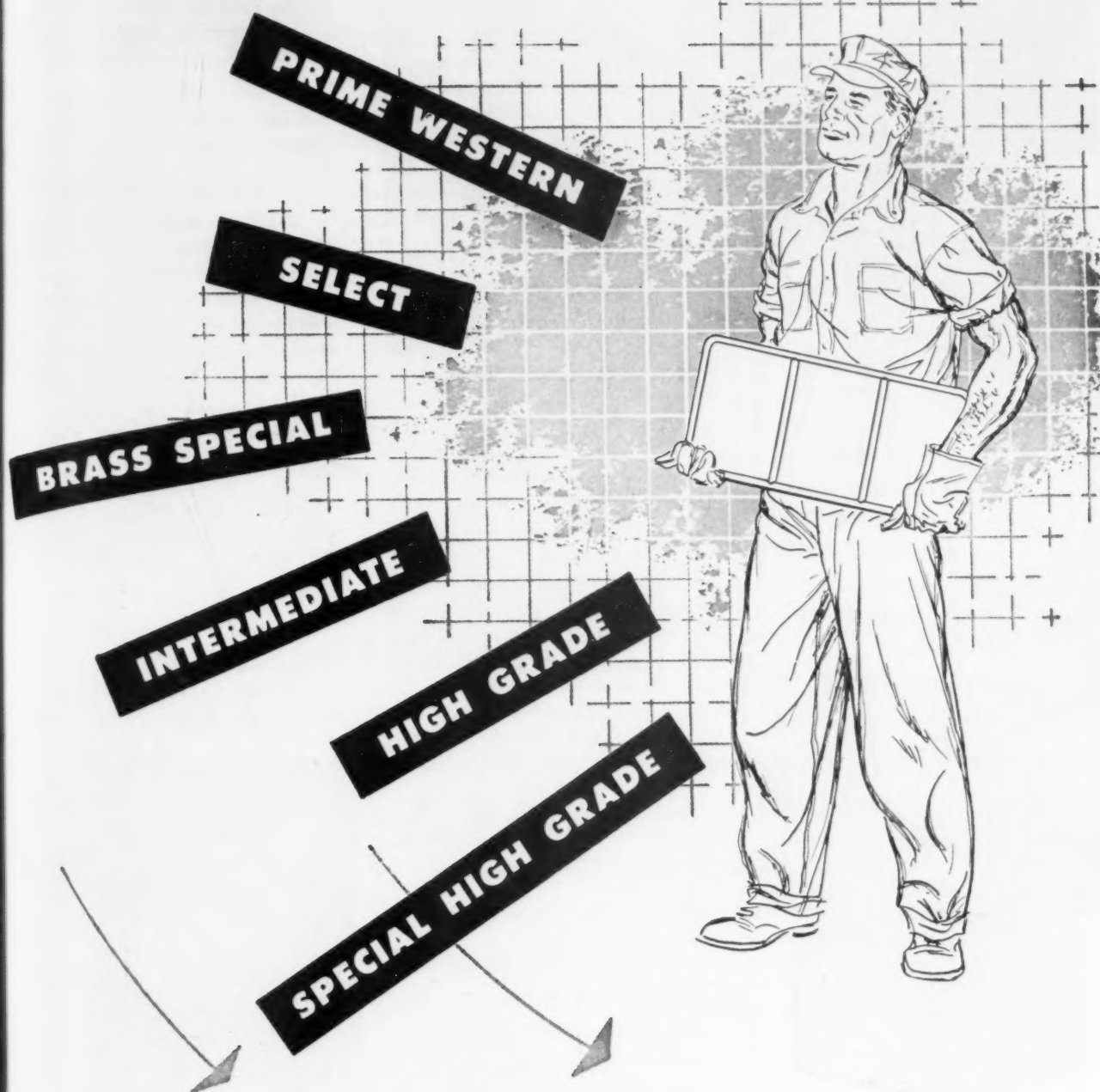


**FIVE CONTINUOUS LINES** pass through furnace simultaneously. Another similar furnace and

one having two lines supply all of Chrysler's car and truck requirements for brake shoes.

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## Technical Briefs

Engineering

### SMOKE CONTROL:

Automatic system simplifies handling of industrial smoke.

Practical low-cost smoke control on coal-fired boilers has been achieved at low cost at American Mfg. Co., Brooklyn, N. Y., with a novel "over-fire air system."

The system consists of a blower and a set of nozzles carefully placed inside the furnace for proper distribution of secondary air over the fuel bed whenever excessive smoke starts to develop. The system is operated by a photo-electric unit which senses smoke densities above the allowable minimum.

#### A Cooperative Venture

The smoke control system can be adapted to a variety of plants where combustible wastes are burned. Engineers of Billmyre Blower Div., Lamson Corp., Syracuse, N. Y., and Sterns-Flinn, New York, makers of manifold and operating controls, cooperated in designing the installation at American Mfg. Co.

As producers of cordage (rope, twine, oakum, etc.), American disposes of nonusable waste by burning on the fuel bed of a bituminous-coal-fired steam boiler. Unless correct quantities of secondary air are supplied over the fuel bed, the boiler produces annoying

**IF YOU WANT MORE DATA**

You may secure additional information on any item briefed in this section by using the reply card on page 121. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

smoke, particularly during the waste incineration.

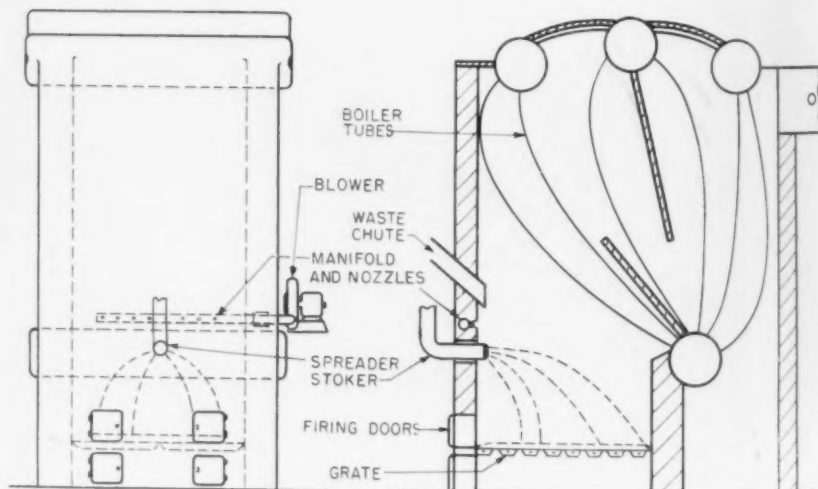
#### How Air Is Delivered

A single stage, 5 hp Lamson-Billmyre blower of heavy welded construction delivers this air, at  $\frac{3}{4}$ -psi, to a 6-in. diam manifold of seamless high-temperature tubing. Tubing is embedded in the refractory of the front firing chamber wall.

Extending from the manifold are nozzles ranging from  $\frac{3}{4}$  to  $1\frac{1}{2}$ -in. in diam which are directed in toward the firing chamber at center-line distances of 6 to 12 in. At American there are 7 such nozzles.

#### Nozzle Velocity High

Nozzle velocity of 25,000 fpm is provided so that velocity of secondary air in the firing chamber over the fuel bed does not slow down to less than 1000 fpm.



SCHEMATIC shows location of manifold and nozzle assembly in furnace front wall.

Photo cell monitors furnace continuously during burning of waste materials.

## and Production Ideas

Other installations will require different nozzle velocities depending on such factors as type of fuel, type of firing equipment, and furnace dimensions. Length of the nozzle should never be more than seven times its inside diameter and not less than three times the ID.

### Protects From Heat

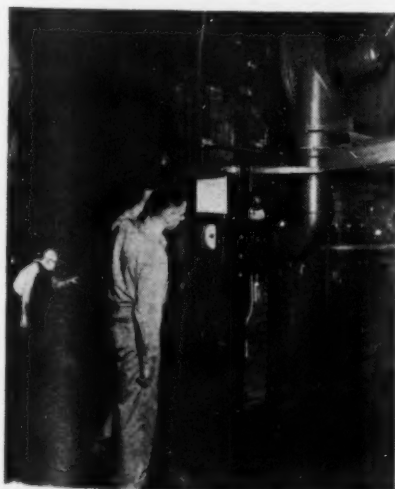
Nozzle tubes are recessed about an inch inside the refractory wall of the firing chamber. The resulting short tunnel induces good air turbulence and protects the metal of the nozzle tube from the heat.

Manifold and nozzles should be assembled by welding for greatest rigidity, although threaded assembly is satisfactory. Slip couplings are also recommended on all connective tubing to simplify assembly and reduce installation costs.

### Photo Cell "Zeroed" In

The photo cell, which actuates the blower, is "zeroed" to tolerate the stack haze normal for satisfactory furnace operation. When haze density increases—a condition which always precedes the formation of objectionable smoke concentrations—the cell starts the blower through a sequencing timer.

Timer may be set to keep the system running continuously for



**AUTOMATIC** over-fire air system operates in response to smoke conditions. Air is blown through manifold and nozzle assembly in furnace wall. Chute deposits nonusable waste on fire bed.

Turn Page

## LIFTING ZONE

Herc-Alloy  
over the  
load...

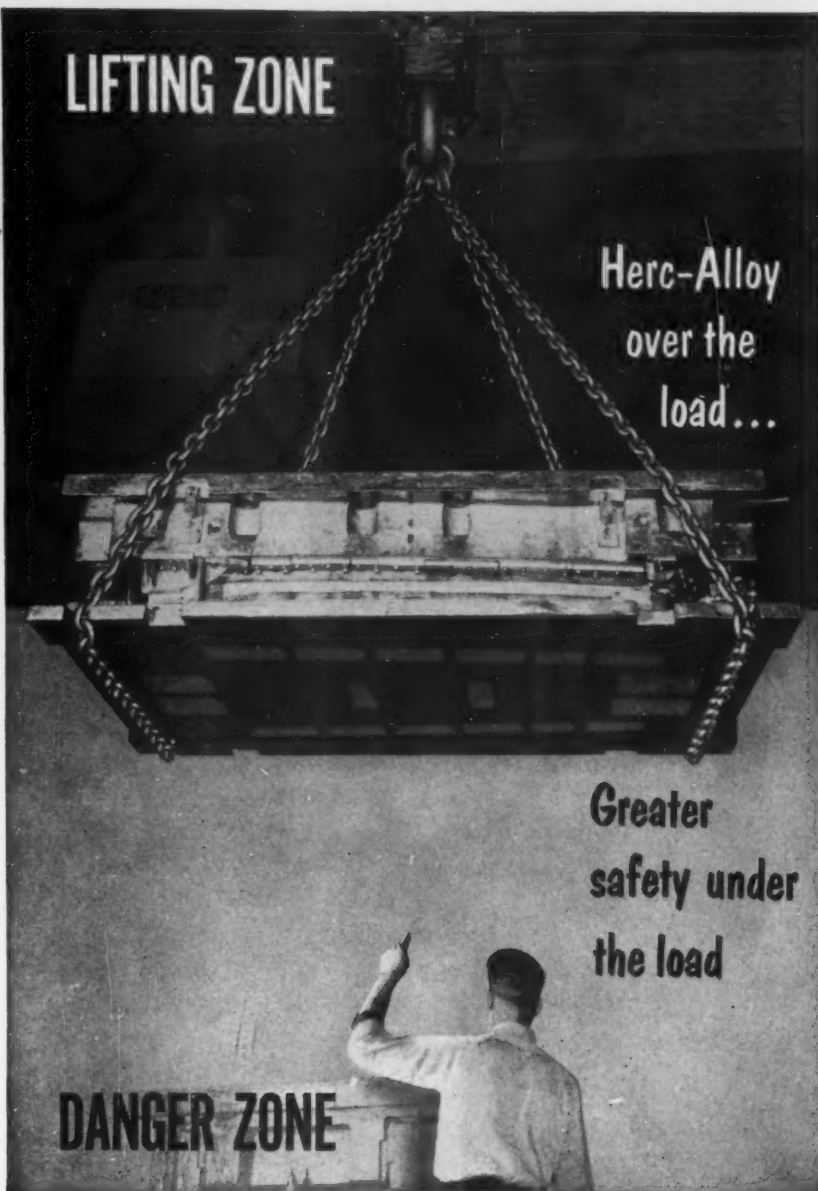


PHOTO COURTESY OF THE BUDD COMPANY, PHILADELPHIA

Greater  
safety under  
the load

## DANGER ZONE

### SPECIFY

# HERC-ALLOY

## SLING CHAINS



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Book

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successful  
rotary air tools

### Technical Briefs

#### Photo cell restarts cycle if stack haze is high . . .

10 sec to 5½ min. This insures that the blower will operate long enough to eliminate the incipient smoke condition completely and prevents rapid cycling of the system.

If at the end of the preset cycle, the stack haze has not diminished to a satisfactory level, the photo cell automatically starts the timer on another cycle without shutting down the blower. Thus, the system will not "hunt" and overwork the motor and controls by frequent stops and starts.

#### System Does Not "Hunt"

A recorder, which receives its input from a photo cell, gives a visual and permanent 24-hr record of the system's operation. In addition to showing that the equipment is operating properly, this record provides an important secondary advantage.

If the chart shows that the smoke control system operates too frequently during a given period, the boiler room superintendent can check for improper operation of the boilers.

#### More Efficient Fuel Use

In some cases excessive occurrence of smoke conditions can be reduced by training personnel to adopt improved methods. These include more frequent cleaning of the fire bed, proper firing, more efficient use of fuel, or possibly, more gradual incineration of

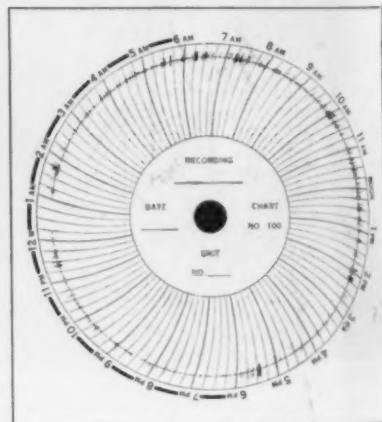


CHART RECORD of operations during a typical 24-hour period at American Mfg. Co. showing system operation.

## —Technical Briefs—

waste to extract its maximum heat content.

The purpose of an over-fire system is to distribute over the fire bed turbulent secondary air in quantities ranging between 5 and 30 pct of theoretical air, the correct percentage being governed by the specific furnace.

Supplementary air mixes with partially burned gases in the high temperature zone above the fire bed, thereby completing the combustion of the gases and preventing their breakdown into free carbon, or smoke.

### BELLOWS:

Components for Cleveland wind tunnel among largest ever made.

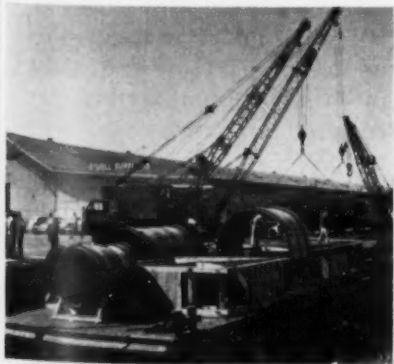
Metal bellows as high as a three-story house were recently built by Solar Aircraft Co., San Diego, Calif., for a supersonic wind tunnel in Cleveland.

The huge stainless steel expansion joints, which will allow the wind tunnel to "give" when under the stress of air pressure or heat, will be installed in a National Advisory Committee for Aeronautics wind tunnel.

A total of 13 expansion joints were built by Solar for this project, ranging from 5 to 28 ft in diam. The entire order, valued at more than \$200,000 weighed 50 tons when ready for shipment.

### Special Techniques Used

Solar used special forming and welding techniques in fabricating the bellows, which consist of stainless steel convolutions—to



FIFTY TONS of stainless steel bellows start long water route trip from San Diego to Cleveland where they will be used in new supersonic wind tunnel.

Turn Page

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## — Technical Briefs —

### **Bellows were shipped via water, truck from San Diego to Cleveland . . .**

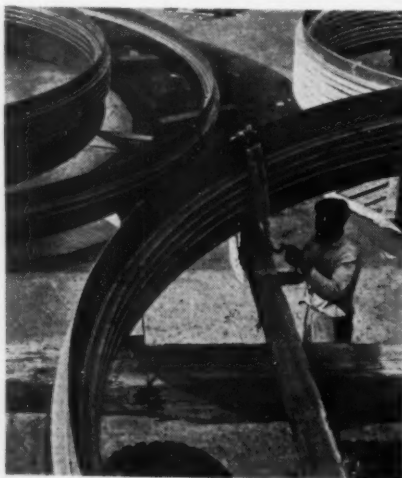
allow expansion and contraction when built into the wind tunnel—joined to carbon steel pipe ends. The company believes the largest previous bellows had a 13-ft OD.

Far too large to be delivered by truck or rail, the expansion joints were shipped from San Diego to Cleveland by a carefully planned water route. They were loaded aboard a special barge in San Diego Bay, and towed to San Pedro, where they were put aboard the S.S. President Tyler.

### Via Panama Canal

The bellows will then go to New York via the Panama Canal. In New York the bellows will again be placed on a barge, towed up the Hudson River through the New York Steam and Barge canal to Lake Erie, and then to Cleveland. Last stage of the journey will be handled by professional house movers, to the site of the NACA wind tunnel, near the Cleveland airport.

Since the expansion joints are flexible, unusual precautions were taken in packing them for shipping. The larger units had steel braces welded to the end flanges as stiffeners, and were then placed in huge crates built of 12 in. square timbers 30 ft long.



**SPECIAL PRECAUTIONS** were needed in crating 13 huge expansion joints for water shipment. Bellows used in wind tunnel to make allowance for contraction or expansion with temperature changes, absorb stresses due to pressure

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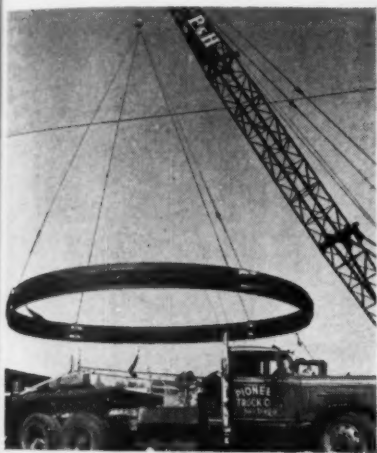
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## Technical Briefs

Crates were then reinforced with 1/2-in. steel plates and bolted together. Crating the shipment cost more than \$6000. Fences were dismantled at the Solar plant to move the bellows out of the yard.

### For Pipe Expansion

Solar manufactures the large stainless expansion joints to cope with pipe expansion at elevated temperatures. In addition to wind tunnels, the large units are used in a variety of industrial processes—refineries, food processing plants, petrochemical installations, atomic energy plants, power plants, and other applications where temperature, pressure, corrosion or erosion are problems.



EXPANSION JOINT, 28-ft in diam, and one of the largest ever built, was produced by Solar Aircraft Co., for new wind tunnel.

## MATERIALS:

Use of hydrazine based chemicals growing rapidly.

Use of hydrazine, one of the most versatile and intriguing materials to spring from the chemical laboratory, is expected to grow rapidly in the future. Based on ammonia, it is a highly reactive substance which first came into prominence near the end of World War II as a rocket fuel.

It has since been produced in this country in limited quantities and has already found use in the manufacture of drugs, photographic chemicals, soldering fluxes, foam rubber, insecticides, plant growth regulators, metal-plating materials, boiler com-

Turn Page

WHELAND COMPANY solves warpage problem, saves time, labor and materials with

# FARQUHAR Hydraulic Presses



500-ton Farquhar Hydraulic Press straightens 16' A forged tubes at The Wheland Co., Chattanooga, Tenn.

This straightening operation utilizes a 50-ton Gap-Type Farquhar Press on an 8-hour-day production basis.



THE Wheland Company, Chattanooga, Tennessee, uses Farquhar hydraulic presses to help speed production of vital defense products. For example, a 500-ton Farquhar Press is used for straightening forged tube approximately 16' long, varying in outside diameter from 6" to 10", with an inside bore of 2" diameter. This operation alone has solved one salvage problem, since less scrap results as stock distribution is equalized by straightening.

Scrap and salvage due to warpage have been eliminated in another operation, where a 50-ton Gap-Type Farquhar Press is used to straighten 7/8" bars, 3" wide, 65" long. Together, the two presses have speeded production. Neither press has required any maintenance other than regular services since installation!

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Just one more example of cost-cutting Farquhar performance in modern production! Farquhar Presses are built for the job . . . assure faster production due to rapid advance and return of the ram . . . greater accuracy because of the extra guides on the moving platen . . . easy, smooth operation with finger-tip controls . . . longer life due to positive control of speed and pressure on the die . . . long, dependable service with minimum maintenance cost!

Farquhar engineers are ready to help solve your production problems. Your request will bring them running . . . at no obligation, of course.

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## Hydrazine is one of the most highly reactive of the inorganic chemicals.

pounds, and other chemical products.

Completion this month by Mathieson Chemical Corp. at Lake Charles, La., of the first plant in the United States to produce hydrazine on a tonnage scale has focused new attention on the many potential applications in industry. More than 2000 derivatives of the material have thus far been reported.

Hydrazine is a clear, colorless liquid which closely resembles water. It has about the same density as water, and its boiling point is only a little higher. It is one of the most highly reactive of the inorganic chemicals, and a powerful and concentrated source of chemical energy.

### High Energy Release

It was its high energy release, however, that gave rise to the original interest in hydrazine as a rocket fuel during World War II. Yet, properly handled, it is not considered a particularly dangerous chemical—no more so, in fact, than gasoline.

As a liquid it burns with a blue flame similar to that of alcohol and is not sensitive to impact or friction. It is shipped commercially in stainless steel drums under a nitrogen atmosphere, which meets all safety requirements for truck and rail transportation.

### Military Uses Grow

During World War II hydrazine was made in the United States in limited quantities for experimental purposes and as a raw material for the manufacture of azides for shell detonators.

After the war Mathieson resumed a research program it had begun in 1939 on applications of hydrazine and inaugurated a companion program on hydrazine production under sponsorship of the United States Government.

This coincided with substantial increases by the military services

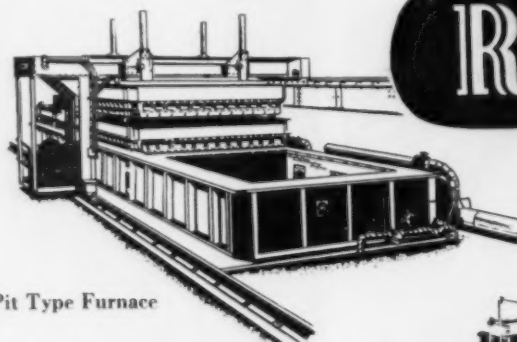
in their developmental activities on liquid-fuel rockets. In 1948 Mathieson began manufacture of hydrazine in pilot plant quantities at Niagara Falls, N. Y.

### Water Eliminated

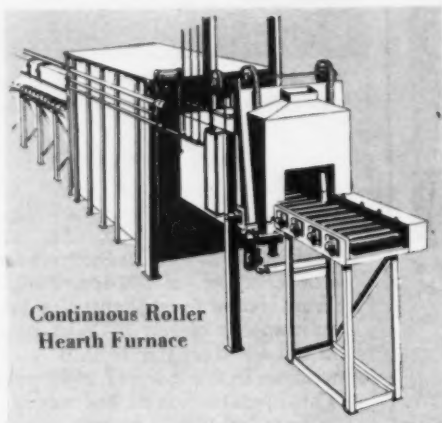
Mathieson research led to two commercially feasible methods for removing the chemically-combined water from the hydrate and carrying the material through to anhydrous hydrazine (95 pct hydrazine).

Commercial-scale production of anhydrous hydrazine thus has been strictly an American development. The anhydrous form has major advantages over the hydrate for many uses.

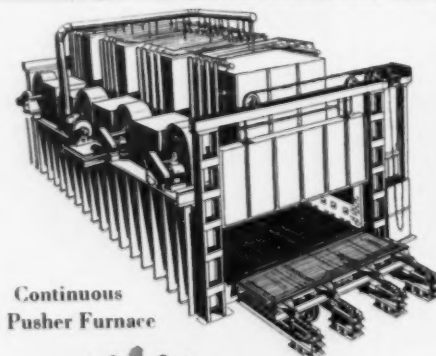
In rocket fuels, elimination of the 36 pct water not only gets rid of useless dead weight but also does away with the need to dissipate part of the energy of the fuel in evaporation of water. As far as industrial uses are concerned, the anhydrous product significantly



Pit Type Furnace



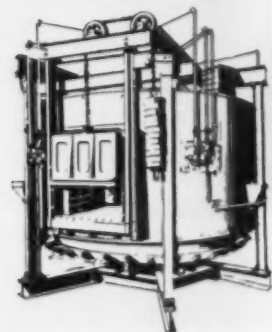
Continuous Roller Hearth Furnace



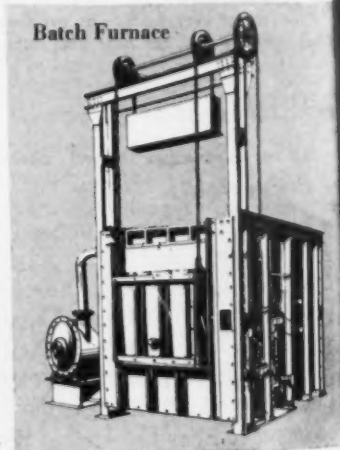
Continuous Pusher Furnace

**R-S HEAT**

Rotary Hearth Furnace



Batch Furnace



## R-S FURNACE TYPES

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Belt Conveyor • Continuous Chain • Continuous  
Pusher • Continuous Pusher Tray • Pit •  
Continuous Roller Hearth • Car Hearth

## Technical Briefs

widens the range of possible reactions with other materials.

### Price May Reach 50¢

Hydrazine originally sold in this country at \$50 a pound when the material was being made only in experimental quantities. By 1949, when pilot plant quantities became available, the price was reduced to \$9 a pound.

Today it carries a price tag of \$2.50 a pound—on a hydrazine basis—for the hydrate in solution.

Further process improvements may ultimately bring this down to about 50¢.

The property of hydrazine that accounts for its principal industrial uses at the moment, however, is its strong reducing (de-oxidizing) action.

### Industrial Uses

As a reducing agent it is used to separate rare metals in a pure state from their oxides or salts, to plate thin coatings of metals on

## Improved fluxes have been developed for soldering aluminum...

glass, plastics and other non-conducting materials, and to remove final traces of dissolved oxygen from boiler water which otherwise would cause corrosion problems.

This reducing action is also put to work in the form of hydrazine hydrobromide as a soldering flux for copper and brass. The flux permits formation of a good soldering bond but leaves no corrosive residue on the metal.

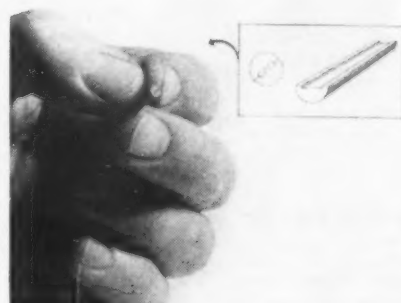
Hydrazine flux is being used widely in the soldering of automobile radiators. Superior fluxes have also been developed for the difficult problem of soldering aluminum.

### DRAWING DIE:

Tiny split die ground to tolerances of  $\pm 0.0002$  in.

A tiny split wire drawing die having tolerance of  $\pm 0.0002$  in., and hardly bigger than the end of a pencil recently posed an unusual grinding problem. The die was successfully ground using a Pratt & Whitney Diaform wheel forming attachment.

The small size of the die together with extremely close tolerances necessitated the making of a preliminary template on a 100 to 1 ratio instead of the usual 10 to 1. This 100 to 1 template made of 3/32-in. flat stock was then used with the Diaform and a 100-GV wheel to produce the 10 to 1 regular template. Two pieces of correct diameter wire were then placed in a "V" block and ground.

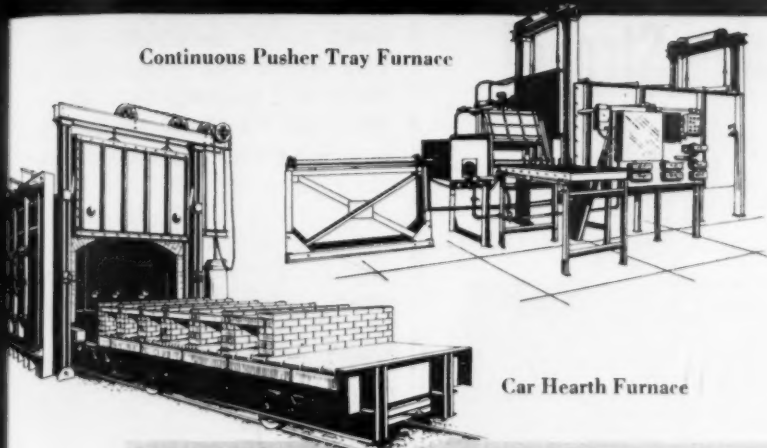


Split wire drawing die...

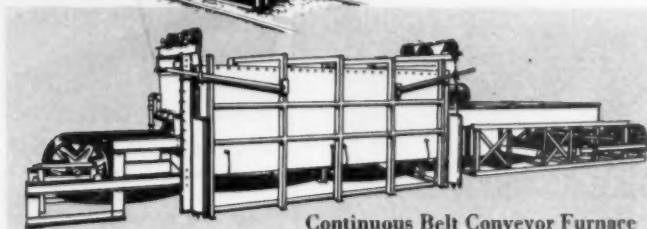
Turn Page

## TREATING FURNACES

Continuous Pusher Tray Furnace

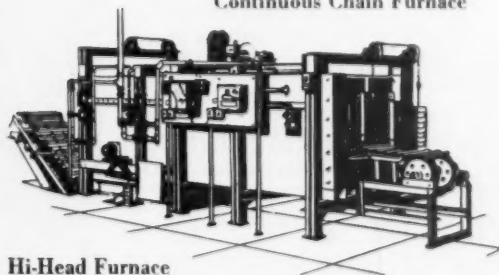


Car Hearth Furnace

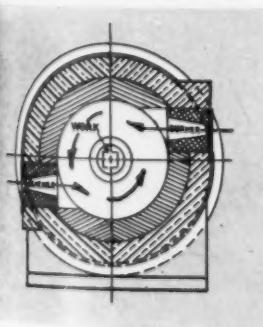


Continuous Belt Conveyor Furnace

Continuous Chain Furnace



Hi-Head Furnace



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A SUBSIDIARY OF

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November 19, 1953

## PLASTICS:

**Lightweight pipe handles crude oil without corroding or clogging.**

First cross-country pipeline entirely of plastic was completed recently in the Williston Oil Basin in Montana. It is now delivering crude oil from a storage tank battery on the Huber Lease within the Fort Peck Indian Reservation to a tank car siding on the Great Northern Railway in Poplar. Ex-

tending more than 9 miles, this plastic line is the longest of its kind on record.

Pipe used in the installation has a 3-in. ID with a wall thickness of 0.125 in. and was produced of Tenite butyrate plastic by the extrusion process.

### To Deliver 2500 bbl Per Day

Designed to operate at a maximum pressure of 90 psi at a temperature of 60° F, the line is

scheduled to deliver 2500 barrels of crude oil per day, with facilities for increasing the capacity in the future.

Crude delivered is a paraffin-base oil containing corrosive sulfuric gas. Experience has shown that steel pipe carrying this oil not only corrodes but clogs with paraffin within a relatively short time.

### How Pipe Is Joined

The butyrate plastic pipe is inherently corrosion-resistant, and preliminary tests indicate that it will conduct the oil with freedom from paraffin accumulation.

A crew of three men, using slip-sleeve couplings and solvent cement, joined the pipeline together in a continuous length along the ditch in a working time of about five days. An ordinary hand-saw was used when necessary to cut the pipe to fit.

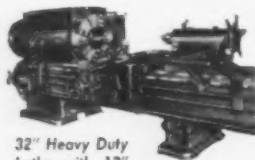
## The First Lehmann HYDRATROL Lathe Ever Sold is Still Going Strong!



## 18 Years of Grueling Service for Lathe #5155

Here is dramatic proof of the durability and rugged dependability of Lehmann HYDRATROL Lathes! The first Lehmann HYDRATROL sold over 18 years ago, is still operating every day. The present owner of this Lathe, A. J. Flowers of the W. L. Flowers Machine

and Welding Co., Alice, Texas, recently wrote us: "We are happy to say we are still operating the Lehmann Lathe Serial No. 5155. We have averaged operating the lathe sixteen hours each day. It is giving excellent service."



32" Heavy Duty Lathe with 13" Hole in Spindle

### Remember these important HYDRATROL features:

- 16 spindle speed changes with only a "Twist of the Wrist" • Automatic slide rule co-ordinated with movement of handle shows spindle revolutions per minute and indicates cutting speeds in feet per minute
- 16 forward and 8 reverse speeds • No need for intermediate stop; unnecessary to disengage the friction driving clutch to change speed
- Hydraulic friction clutches and hydraulic brakes, self compensating
- Automatic safety relay for harmless and easy engagement of positive clutches when speeds are changed • Spindle release for chucking
- Safety-control lubrication with filtered oil • Gears constantly in mesh • Safe in operation • Simple construction and operation.

### FIVE SIZES—18" to 36"

Small . . . 18" up to 7 1/2" Hole  
Medium . . . 25" up to 12" Hole  
Large . . . 32" up to 13" Hole  
Large . . . 36" up to 16 1/2" Hole  
(Standard type lathes, 16" to 36")

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**LIGHTWEIGHT** plastic pipe section with 3-in. ID weighs only 13 lb. Pipe is used in crude oil pipeline, resists corrosion, does not clog with paraffin accumulation.



**INSTALLATION** is simplified with plastic pipe. Special coupling and solvent were used to make connections.

## Technical Briefs

### ELECTRONICS:

**Unusual nutcracker "explodes" 1200 lb of walnuts per hour.**

An electronic nutcracker which explodes walnuts right out of their shells in unmarked halves is setting new production records in the Portland, Ore., processing plant of the Northwest Nut Growers. The unit may have other industrial applications.

A one-third increase in production is credited to the nutcracker. It automatically shells 1200 lb of walnuts an hour. The former crusher type shelled 900 lb an hour with a much lower yield of nut halves.

### Store Up Charge

Key unit in the "cracker" is a bank of special box-like capacitors developed by Westinghouse Electric engineers after two years of pilot plant operation.

Capacitors store up electricity and release it in 65,000-v, 5000-amp bursts 20 times a second. Such a sudden high surge of current causes the shell target to break away from the nutmeat as neatly as if it were broken in a person's palm.

As the annual harvest nears its peak in nearby orchards, 6000 lb of nutmeats are expected to be packaged each day until mid-March. Of 1200 lb of nuts in the shell, 400 lb of nutmeats ordinarily are extracted.

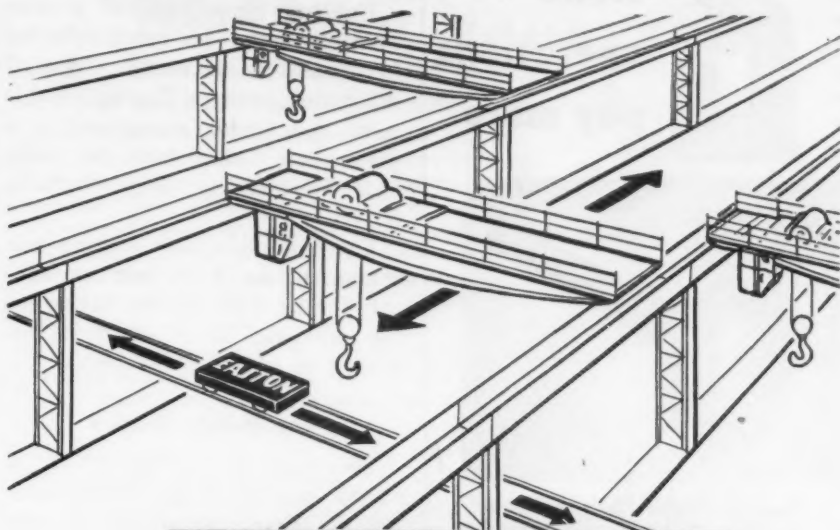
### How It Works

As the walnut tumbles off a threaded feeder roll, it is positioned and grasped in mid-air between its stem and blossom end by two metal fingers called electrodes. The 65,000-v jolt pierces the shell through the electrodes, then the shell and meat drop onto a vibrator conveyor which severs the nutmeat from its shell shelter.

A "cracking" crew of 60 now handles the same volume of nuts as the former crew of 100. There are 18 units in the cracking room, an insulated chamber of reinforced concrete with peepholes for attendants' use. Shelling rates of 60 per sec may be possible.

# Cross-Bay Transfer

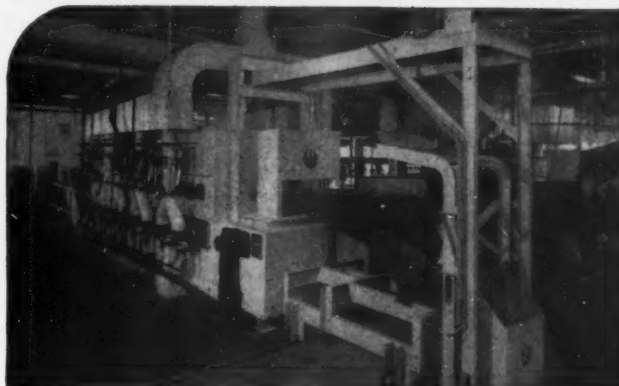
Automatic motor-driven transfer cars provide a universal handling system in modern parallel bay plants now served by overhead cranes. Also for transfer between plant buildings.



# EASTON

A-1041

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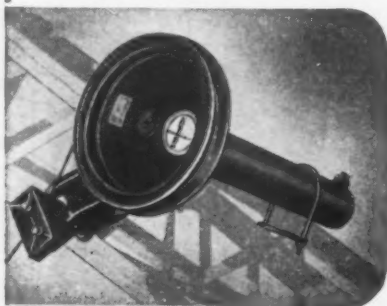
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to make  
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## Technical Briefs

### MACHINING:

**New laboratory press will have massive base.**

Constant demands for greater press pressures are being reflected in constantly increasing size of laboratory presses. Typical of this new, and larger equipment is a press now being built by Lake Erie Engineering Corp., Buffalo, N. Y.

The huge steel base casting machined on an 8 in. bar horizontal boring mill is indicative of the size and scope of work involved in building the press.

### For Metals Studies

This unit weighs 168,000 lb, is 220 in. long, 66 in. deep and towers 192 in. Upon completion, it will become the bed or bottom platen for a 5000-ton laboratory press designed and built for advanced study of metals under pressure.

Parts of this weight and dimension are handled easily by the modern facilities of the Lake Erie shops in the process of building social hydraulic presses such as this one and over 3500 other designs.

### Invent Tiny Radiation Source

Small self-contained sources of X-rays for use in industry and medicine may soon be a commercial reality as a result of work in progress at Armour Research Foundation of Illinois Institute of Technology, Chicago.

Research efforts sponsored by the Foundation have been aimed at development of a "pocket-size" radiation source invented by Dr. Leonard Reiffel, supervisor of the Foundation's nuclear physics section.

### Source Self-contained

The new X-ray source can be made in almost any size, from tiny pellets to larger blocks or sheets. Another advantage is that it is entirely self-contained.

There is no bulky electronic equipment and no wiring connections as in conventional X-ray generators.

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- 4 Electrocleaning zinc-base die castings
- 5 Putting heavy zinc phosphate coatings on steel in preparation for painting
- 6 One-operation cleaning, pickling and conditioning for painting
- 7 Stripping paint
- 8 "Killing" paint in spray booth wash water
- 9 Drawing and forming

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## Technical Briefs

### CERAMIC COATING:

Extends use of nickel for high-temperature applications.

One of the first successful methods for applying a ceramic coating to commercial nickel has been developed by the Ceramics Dept. of Oak Ridge National Laboratory which is operated by Union Carbide and Carbon Corp. for the AEC. The process is considered important because nickel, one of the refractory metals, has excellent thermal conductivity characteristics. It is limited for high-temperature use by its poor resistance to oxidation.

The new process may permit the use of nickel in jet engines, gas turbines, guided missiles, and other high-temperature devices.

### Coating Adheres Well

The coating method consists of annealing nickel specimens in water-saturated hydrogen at 1000°F. Specimens are then sprayed with National Bureau of Standards ceramic coating A-418, dried, and fired. After heating in an oxidizing atmosphere at 1500°F for 65 hr, specimens still had good appearance and showed improved adherence of the coating.

The advantage of using wet hydrogen over dry hydrogen in the annealing process is indicated by the durability of the coating at elevated temperatures obtained with wet-hydrogen-annealed nickel. Specimens annealed in an atmosphere of dry hydrogen before coating produced a bubbly surface condition.

### WELDING:

Powdered metal in electrode coating speeds hand welding.

Incorporation of powdered metal in electrode coatings, believed to be a new approach to electrode design, may considerably speed hand welding operations, makers of a new electrode claim.

The new Jetweld electrode, made by Lincoln Electric Co., Cleveland, is a heavily coated shielded-arc type for operation in flat or near flat positions with alternating or

Turn Page

# MORE FLEXIBILITY IN YOUR SHOP

Harden, heat treat, temper and anneal with one furnace . . . the Johnson No. 706.

Another in the Johnson line of dependable gas equipment has won its place in both large and small shops and plants. Operators like its easy adaptability. Six Johnson Direct Jet Bunsen Burners with individual shut off valves and pilot lights provide steady, easily controlled heat from 300 to 1850° F. Semi-muffled type with burners operating below Carbofrax hearth. Firebox: 7" x 13" x 16 1/2". Also available bench style. Write for complete and factual information.

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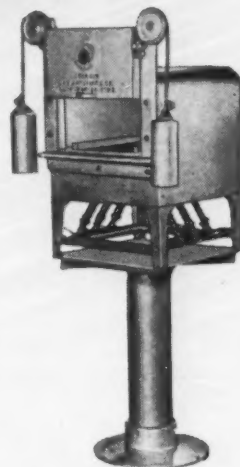
Johnson No. 706 Pedestal Style	\$300.00
Bench Style	\$275.00
Johnson No. 654 Pedestal Style	\$163.00
Bench Style	\$138.00

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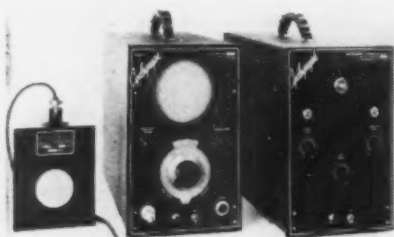
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## Technical Briefs

### Drag electrode simplifies tack welding . . . No coating breakdown

direct current welding. It meets the physical requirements of class E-7016 and is used on work formerly calling for E-6012 and E-6020 electrodes on single pass or multiple pass welds.

#### Good Weld Properties

The electrode is suited for horizontal and flat position fillets, horizontal and flat position laps, single and multiple pass butts, deep grooves and corners, cover pass on multiple pass butts. Some of the higher carbon steels may also be welded without cracking and without surface holes.

Weld metal is uniform X-ray quality, free from undercut with better impact values at low temperatures than is possible with electrodes other than low hydrogen types. Typical physical properties, as welded, are: tensile strength, 93,000 psi; yield point, 79,000 psi; elongation in 2 inches, 15 to 22 pct. Typical Charpy key-hole impact value at room temperature is 28 foot pounds. At -70°F value is 20 foot pounds.

#### It's A "Drag" Electrode

Welding speeds typical in lap and fillet work are on the order of 12 to 15 ipm. Bead appearance is smooth, comparable to that normally associated with automatic hidden arc welding. The slag produced curls off as it cools to make the welds practically self-cleaning. Welds are also virtually spatter free. It has a smooth, stable arc action which is highly resistant to arc blow.

#### Tack Welding Simplified

It is a "drag" electrode which is operated with the coating touching the work. This makes for ease of operation, simplifies tack welding and operator training. The elimination of coating breakdown permits using the entire coated portion of the electrode, reducing stub loss to an irreducible minimum.

Turn Page

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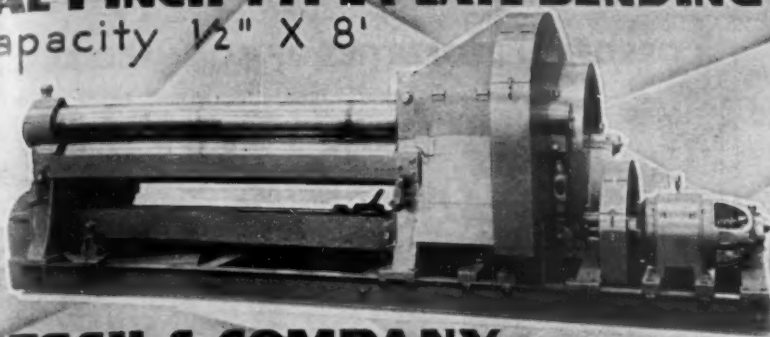
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nati 14, Ohio. JOHN E. LOVE, 2832  
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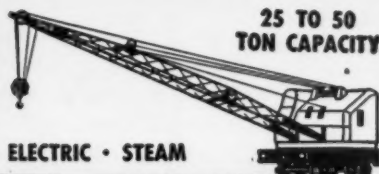
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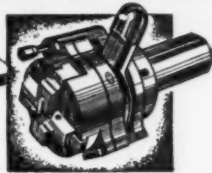
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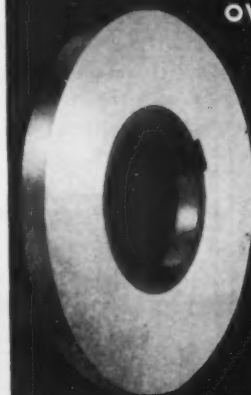
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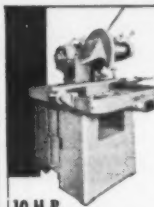
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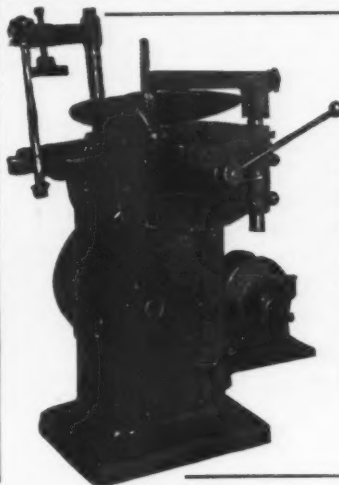
Easy to operate.

Table adjustable for  
straight or taper keyways.

Three sizes. Keyways  
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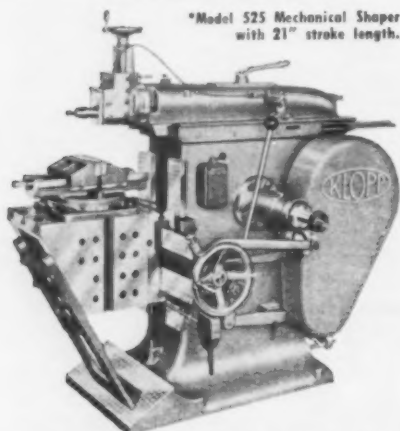
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Bulky, awkward-to-handle work pieces are easily accessible and simple to set up in the KLOPP. It's built for high-speed, too, by Europe's largest manufacturer of shapers . . . used in 108 U. S. plants.

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## Technical Briefs

### CORROSION PROPERTIES OF COMMERCIAL TITANIUM

Courtesy Rem-Cru Titanium Inc., Midland, Pa.

Reagent*	Concentration Pct by Weight	Temp., Deg. C	Rating
Acetic acid . . . . .	5, 25, 50, 75, 99.5	Boiling	A
Acetic anhydride . . . . .	99	Room	A
Aluminum chloride . . . . .	5, 10	100	A
	25	60	A
	25	100	C
Ammonia, anhydrous, 200 psi . . . . .	100	40	A
Ammonium chloride . . . . .	1, 10, saturated	100	A
Ammonium hydroxide . . . . .	28	Room	A
Aniline hydrochloride . . . . .	5, 20	100	A
Aqua regia (1HNO <sub>3</sub> :3HCl) . . . . .	—	Room	A
Barium chloride . . . . .	5, 20	100	A
Calcium chloride . . . . .	5, 10, 25, 28	100	A
Calcium hypochlorite . . . . .	2, 6	100	A
Carbon tetrachloride (with 1% water) . . . . .	—	Boiling	A
Chlorine gas (dry, 0.005% water) . . . . .	—	70	C
Chlorine gas (wet, more than 0.013% water) . . . . .	—	30	A
Chlorine saturated water . . . . .	—	Room	A
Chloroacetic acid . . . . .	30	80	A
	100	Boiling	A
Chloroform—water mixture . . . . .	—	Boiling	A
Chromic acid . . . . .	10	Boiling	A
	35.5	80	A
Citric acid, aerated . . . . .	10, 25, 50	100	A
Citric acid, nonaerated . . . . .	50	Boiling	B
Cupric chloride . . . . .	1, 20	100	A
	45	Boiling	A
Dichloroacetic acid . . . . .	100	Boiling	A
Ethylene dichloride . . . . .	100	Boiling	A
Ferric chloride . . . . .	1 to 30	100	A
	10	Boiling	A
Ferric chloride + 10% NaCl . . . . .	5	100	A
Formaldehyde . . . . .	37	Boiling	A
Formic acid, aerated . . . . .	10, 25, 50, 90	100	A
Formic acid, nonaerated . . . . .	10	Boiling	A
	25, 50, 90	Boiling	C
Hydrochloric acid . . . . .	1	70	C
	1	Boiling	A
	3, 5	Room	A
	3, 5	70	B
	3, 5	Boiling	C
	10	Room	B
	10	70	C
	20, 37	Room	C
Hydrochloric acid—200 mg Cu/L . . . . .	37	Room	A
Hydrochloric-nitric acid mixtures: (HCl:HNO <sub>3</sub> ) . . . . .	1:3, 2:1, 3:1, 4:1	Room	A
	5:1	Boiling	A
	7:1, 20:1	Room	B
	1	Room	C
Hydrofluoric acid . . . . .	100	Room	B
Hydrofluoric acid, anhydrous . . . . .	100	Room	A
Hydrogen peroxide . . . . .	3, 6, 30	Room	A
Hydrogen sulfide (saturated water) . . . . .	—	70	A
Lactic acid, aerated . . . . .	10, 25, 50, 85	100	A
Lactic acid, nonaerated . . . . .	10, 25, 50, 85, 100	Boiling	A
Magnesium chloride . . . . .	5, 20, 42	Boiling	A
Manganese dichloride . . . . .	5, 20	100	A
Mercuric chloride . . . . .	1, 5, 10, saturated	100	A
Nickel chloride . . . . .	5, 10	100	A
Nitric acid . . . . .	10, 20, 30, 40, 60, 70	100	A
	50	100	AB
	65	Boiling	A
Nitric acid, red fuming . . . . .	—	Room	A
Nitric acid, white fuming . . . . .	98	Room	A
	95	70	A
Nitric acid, under equilibrium pressure . . . . .	65	168	A
Oxalic acid, aerated . . . . .	0.5, 5, 10	35	A
	0.5, 1, 5, 10, 25	60	C
Phosphoric acid . . . . .	5, 10, 20, 30	35	A
	5 to 35	60	B
	5	100	C
	10	80	C
Potassium hydroxide . . . . .	10	Boiling	A
Sodium chloride . . . . .	20, saturated	Boiling	A
Sodium hydroxide . . . . .	10	Boiling	A
	40	80	A
Sodium hypochlorite (5.8% Cl <sub>2</sub> ) . . . . .	—	Room	A
Sodium sulfide . . . . .	10	Boiling	A
Stannic chloride . . . . .	5, 24	100	A
Stearic acid . . . . .	100	182	A
Sulfur dioxide (saturated water) . . . . .	—	70	A
Sulfur, molten . . . . .	100	240	A
Sulfur, water suspended . . . . .	—	Room	A
Sulfuric acid . . . . .	5	35	B
	10	35	C
	20-50	35	B
	60-70	35	B
	Above 70	35	C
Sulfuric-nitric acid mixtures: (H <sub>2</sub> SO <sub>4</sub> :HNO <sub>3</sub> ) . . . . .	10:90, 30:70, 50:50, 60:40	35	A
	70:30	35	B
	80:20, 90:10, 99:1	35	B
Tannic acid . . . . .	25	100	A
Tartaric acid . . . . .	10, 25, 50	100	A
Tetrachloroethane, water mixture . . . . .	—	Boiling	A
Tetrachloroethylene, water mixture . . . . .	—	Boiling	A
Trichloroacetic acid . . . . .	100	100	A
Trichloroethylene, stabilized, water mixture . . . . .	—	Boiling	A
Trichloroethylene, unstabilized, water mixture . . . . .	—	Boiling	A
Zinc chloride . . . . .	5, 10, 20	Boiling	A

\*—Solutions were not aerated with air unless otherwise indicated. A—Corrosion of not more than 5 mils penetration per year. B—Penetration of 5 to 50 mils per year. C—Penetration above 50 mils per year.

## THE IRON AGE SUMMARY...

- ▶ Customers give plenty of assurance but place few orders
- ▶ Buyers will no longer place orders several months ahead
- ▶ Scrap market remains slow; steel ingot rate off one point

Steel producers, trying to get a line on future business, are encountering a puzzling paradox. Customers are giving them plenty of assurance that they will use large amounts of steel next year, but they are mighty slow to get their orders on the books.

Reluctance of their customers to convert optimistic statements into orders is causing some steel sales officials to predict that January will be the slowest month of the first quarter. This may or may not prove true.

But this is definitely true: Steel buyers will no longer place orders several months in advance of need—except for a few items that are still in short supply. Price is now more important than delivery.

The auto industry furnishes a good example: Automakers are still answering to their stockholders for the high cost of steel procurement in 1953's tight market. Chrysler placed its excess costs for steel at \$29 million. Among the independents, Nash recently pegged its abnormal (in Detroit they call it "excessive") steel costs at \$12 million.

Of course, automakers aren't the only manufacturers who paid extra for their steel. And they have no monopoly on determination to do their future buying at the best possible price.

Still, the lucrative Detroit market is such a tasty plum that it can not be overlooked by out-of-area producers who decide to absorb freight. One mill that ships by water to Detroit can meet the price on sheets of the biggest local producers. Question now is whether this will continue after lake navigation closes. If it does, it will take a lot of equalizing.

So far, only moderate amounts of freight have been absorbed on flat-rolled products shipped into Detroit. But steel purchasing agents, alert to the buyers' market, are aggressively negotiating the best possible buys. Producers have been picking up some freight tabs on wire, bars, and mechanical tubing for the past 2 months.

Steel producers can expect growing pressure from their customers to reduce shipping costs—and perhaps extras.

Premium price shaving is continuing. Cold-rolled strip prices were reduced \$5 a ton by a large producer in the Chicago area. The new price is competitive with other producers in the area. A Detroit producer who had previously lowered its cold-rolled strip premium, shaved it another \$1 a ton to meet competition.

A West Coast producer reduced carbon forging billets, blooms and slabs \$11 a ton to competitive level of the area, although the price is still \$8 a ton above mill prices in the East. The same producer lowered carbon rerolling billets, blooms and slabs \$11 a ton.

Warehouse inventories are getting close to desired levels on all but a few steel items. Despite reports of some sales sluggishness, warehouse people generally expect another good year in 1954.

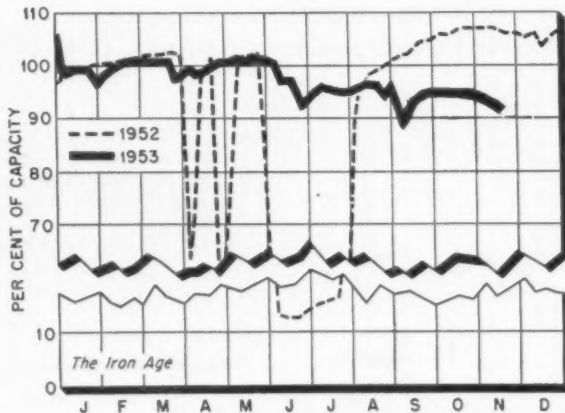
Weaker tones prevail in the scrap market. Buying is slow. THE IRON AGE Steel Scrap Composite Price however did not change from last week's \$35.33.

### Steel Operating Rates

	Week of Nov. 15	Week of Nov. 8		Week of Nov. 15	Week of Nov. 8
Pittsburgh	90.0	93.0*	Detroit	98.0	94.0*
Chicago	96.5	97.0	Birmingham	96.5	96.5
Philadelphia	94.0	94.0*	Wheeling	101.0	102.0
Valley	93.0	92.0*	S. Ohio River	73.5	81.0
West	93.0	91.0*	St. Louis	90.0	89.0
Cleveland	94.0	92.0	East	98.0	103.0*
Buffalo	99.5	106.5	AGGREGATE	91.5	92.5*

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,547,470 net tons.

\* Revised





**"We can run Free-Machining ENDURO  
Stainless Steel Bars at about 90%  
of our Bessemer screw stock rate"**

● Yes! You can switch the steel specification for a part from Bessemer screw stock to either of two grades of ENDURO Stainless Steel Bars (A.I.S.I. 416 and 430-F) with only a minor difference in your automatic production rate. These ENDURO Stainless Steel Bars, as cold-finished by Republic's Union Drawn Steel Division, are *fully 90% as machinable* as Bessemer screw stock. But now consider the plus benefits such a switch to ENDURO can give you!

Close tolerance, accuracy of section, uniform soundness, fine surface finish—to help

you produce fine quality parts at highest production rates and at lowest costs. Plus the high strength of an alloy steel. Plus the stubborn resistance to rust and corrosion for which ENDURO is famous.

Free-machining ENDURO also is available in hot-rolled bars and wire. And experienced Republic metallurgists will offer you expert assistance in applying ENDURO Stainless Steel in any form. Just write:

**REPUBLIC STEEL CORPORATION**

*Alloy Steel Division • Massillon, Ohio*

**GENERAL OFFICES • CLEVELAND 1, OHIO**  
Export Department: Chrysler Building, New York 17, N. Y.



Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

# Markets at a Glance

**Cut Strip Prices . . .** Acme Steel Co., Chicago, has trimmed \$5 per ton from its price for cold-rolled low carbon strip steel. New price is \$5.70 per 100 lb and is competitive with other producers in the district. Also coming down to \$5.70 per 100 lb on this product was Detroit Tube & Steel Div. of Sharon Steel Corp.

**Cut Semi-Finished Price . . .** Kaiser Steel Co. last week announced price reduction of \$11 per ton on carbon re-rolling and forging quality billets, blooms and slabs. Tonnage involved is minor. Shipments are mostly to a few forge shops and fabricating plants. New prices are \$70 per net ton for re-rolling quality; \$83.50 for forging quality.

**Renovate Blooming Mill . . .** Inland Steel Co. last week completed renovation of one of the three blooming mills at its Indiana Harbor, Ind., works. Changeover was made in a 23-day period with a production loss of only about 100,000 tons.

**Shut Down Furnaces . . .** Jones & Laughlin Steel Corp. last weekend shut down four open hearths in No. 2 shop at its Pittsburgh works. Two weeks ago the company took out of production five other furnaces in this same shop, along with a blast furnace. J & L described the shutdown as temporary.

**Canadian Mills Catching Up . . .** Canadian steel industry has a substantial volume of business for delivery before the end of this year. Hot and cold-rolled sheets as well as galvanized sheets are still in tight supply, but last quarter commitments should be delivered by the end of December. Mills are catching up with orders and should be able to deliver on schedule during the first quarter.

**Use Plastics for Refrigerators . . .** Admiral Corp. estimates that electric refrigerator manufacturers will use approximately 57,500 tons of plastics this year. The company also stated that the 1954 Admiral refrigerator line will use from 20 to 22 lb of plastics per unit.

**Construction to Stay at High Level . . .** Expenditures for new construction are expected to total about \$34 billion next year, estimates Dept. of Commerce and Dept. of Labor. This would be only 2 pct less than the \$34,750,000,000 estimated for this year.

**Russia May Ship Ore to U. S. . . .** The Kremlin may be lifting the Iron Curtain just enough to let some Russian chrome and manganese ore "escape" to the U. S. in exchange for dollars. Russians stopped shipments of strategic ore to the U. S. 5 years ago, although moderate tonnage has continued to trickle through. Chrome supply never was squeezed too badly, and alternate sources of manganese have been developed in free countries. We do not now need the Russian ore.

**Titanium Shortage . . .** Titanium is in such short supply it could be "the limiting factor" in mobilization of the nation's air strength in a war emergency, a Senate strategic materials subcommittee was told in Los Angeles recently. Brig. Gen. Kern Metzger expressed concern over the fact that aircraft engineers are stressing heavy use of titanium in aircraft design despite the current scarcity of this metal.

**Inventory Buying Dips . . .** Curtailment of inventory buying during the third quarter was the biggest single factor in the decrease of the gross national product from a high point of \$372.4 billion to about \$369 billion, U. S. Commerce Dept. reports. Decline in inventory buying amounted to \$4.3 billion, but this was partly offset by an increase of \$1 billion in governmental and private procurement, leaving the net loss at \$3.3 billion.

**Steel Wages at New High . . .** Average hourly wage payments in the iron and steel industry rose to a new high of \$2.328 in September, reports American Iron and Steel Institute. With the inclusion of the cost of pensions, social security and insurance, on the basis of the average for last year, the total cost per hour would be nearly \$2.50.

## Prices At A Glance

(cents per lb unless otherwise noted)

Composite Prices	This Week	Last Week	Month Ago	Year Ago
Finished Steel, base . .	4.632	4.634	4.634	4.376
Pig Iron (gross ton) .	\$56.59	\$56.59	\$56.59	\$55.26
Scrap, No. 1 hvy. (gross ton) . . . . .	\$35.33	\$35.33	\$32.83	\$42.00
<b>Nonferrous Metals</b>				
Aluminum, ingot . . .	21.50	21.50	21.50	20.00
Copper, electrolytic . .	29.75	29.75	29.50	24.50
Lead, St. Louis . . . .	13.30	13.30	13.30	14.30
Magnesium, ingot . . .	27.00	27.00	27.00	24.50
Nickel, electrolytic . .	63.08	63.08	63.08	59.58
Tin, Straits, N. Y. . .	82.50	81.75	80.25	\$1.21¼
Zinc, E. St. Louis . . .	10.00	10.00	10.00	12.50

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## Trim Aluminum Defense Setaside

**AEC and military will take only 97,000 tons of aluminum in first quarter—a 20,500-ton cut . . . Producers ask revision of stockpile specifications—By R. L. Hatschek.**

Softness already evident in the aluminum market (See p. 113) will be accentuated in the first quarter by further trimming of defense setasides. Last week Business and Defense Service Administration announced the setasides for the first 3 months of 1954 will be 97,000 tons.

This figure is 20,500 tons shorter than the current quarter's ration for atomic energy and military needs. It amounts to 24 pct of the anticipated supply as compared to 29 pct in the fourth quarter of 1953—which in turn was smaller than previous setasides.

**Ingot Up Again . . .** Despite this outlook, secondary aluminum smelters have again boosted ingot prices. Practically all grades of remelt aluminum are quoted  $\frac{1}{4}\epsilon$  to  $\frac{3}{4}\epsilon$  per lb higher this week.

It comes as no surprise, however, since ingot makers are now paying more for their scrap. Old cast, pots and pans and turnings now cost them as much as 13¢ per lb as compared to 10¢ to 11¢ only a few weeks ago. Quotations on dealer buying prices were lifted last week.

Reason for the action is continuing high demand from overseas. For that reason, competition for material in the East is consider-

ably stronger than in other sections of the country.

**Seek Clarification . . .** The Aluminum Assn. has asked Defense Dept. for clarification of the recently announced policy on the "Buy American" clause and how it pertains to aluminum mill products. Defense Dept. is to reply to the committee's statement within a few days.

Just what the statement contained hasn't been disclosed—but it's a pretty safe bet that the group has joined National Assn. of Aluminum Distributors in asking that the Buy American exception be limited to pig and ingot rather than mill products (See THE IRON AGE, Oct. 29, p. 121).

Imports of foreign mill products, particularly sheet, are reported to be working a hardship on U. S. producers with current softness in the market.

**Ask Downgrading . . .** In a meeting with BDSA last week, the aluminum industry has requested the government to revise its high specifications for stockpile ingot. It's a well known fact that getting high-purity metal from new potlines is difficult if not impossible and producers are having a tough time meeting government specs.

Lower quality metal should be accepted, said one member of the group, until production bugs have been ironed out of the new facilities that are producing for the stockpile. This policy, he suggested, should be carried out through next year in some cases at least.

**Chile Talks Still Off . . .** Nobody's yet been able to pump air into the flat tire that the U. S.-Chile copper talks have become. Chile now says talks will be resumed when it's "convenient." It seems as if the Chileans are just waiting around for some new factor to pop into the situation to strengthen their hand in negotiations.

Main weapon in original dealings was the threat to sell to Russia or her satellites. Now the Chileans have reversed. They say they don't want to sell behind the Iron Curtain. Latest is a report that Finland is in the market—would barter on the basis of 35¢ for copper.

A rapid conclusion to this dickering is becoming more and more vital—particularly to Chile. And continued speculation can do nothing but harm to the market. Meanwhile, U. S. industry is managing pretty well on domestic and other foreign copper sources.

**Production Climbs . . .** October statistics of the Copper Institute show a marked rise in refined production both in the U. S. and outside the U. S. Total of 218,770 tons compares with figures of early summer and is well over the 185,603-ton output of September. Deliveries to fabricators also showed a significant jump.

U. S. fabricators got 110,519 tons as compared to 104,886 tons in September and deliveries in the rest of the world jumped from 48,896 tons in September to 70,258 tons in October. Nevertheless, refined stocks jumped 33,741 tons to a total of 342,984 tons, of which 84,303 tons is in the U. S.

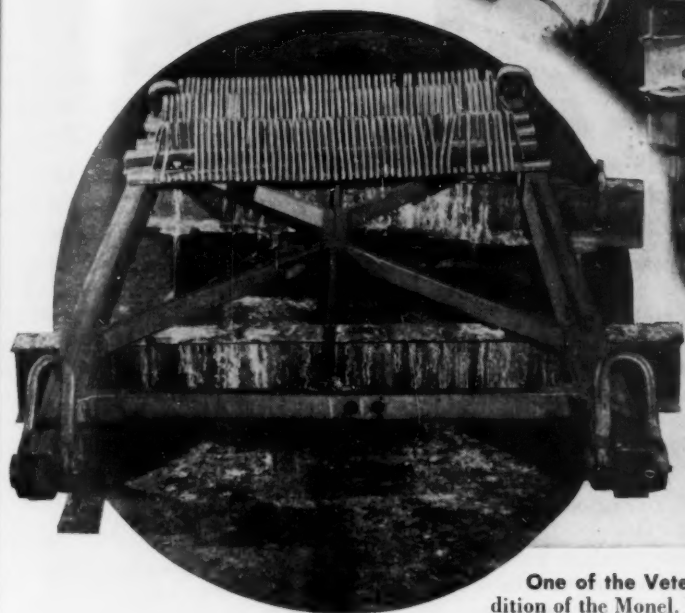
### NONFERROUS METAL PRICES

(Cents per lb except as noted)

	Nov. 11	Nov. 12	Nov. 13	Nov. 14	Nov. 16	Nov. 17
Copper, electro, Conn. ....		29.50-	29.50-	29.50-	29.50-	29.50-
.....		30.00	30.00	30.00	30.00	30.00
Copper, Lake delivered ....		30.125	30.125	30.125	30.125	30.125
Tin, Straits, New York ....		82.00	82.00	.....	82.50	82.50*
Zinc, East St. Louis ....		10.00	10.00	10.00	10.00	10.00
Lead, St. Louis ....		13.30	13.30	13.30	13.30	13.30

Note: Quotations are going prices

\*Tentative



One of the Veterans posed to show condition of the Monel. Racks on rear of pickling crate hold flats in position for pickling. They're Monel, too. This crate is being repaired by Strohecker, Inc., Enon Valley, Pa., for still more service.



Going Over the Top and into sulphuric acid bath. Support for pickling crate provided by Monel hooks. Notice corrosion of surrounding equipment not of Monel.

## How much *More* life do you think there is... in this 25-year-old Monel Pickling Crate?

Look it over well!

Check the edges of those old rivet holes! Look at the joints! See what shape the members are in . . . and the lift yokes and pins!

To be fair, we should tell you that the crate has been repaired now and then by Strohecker, Inc. and, as you see, it's welded now, not riveted. We had better say, too, that it is one of 12 left . . . out of 14 Monel® crates bought in 1928.

There is some mystery about those other two crates. No one at Sharon Steel Corporation recalls their exact fate. Perhaps they were damaged somehow and the master mechanic used the Monel to make something else. At any rate, they're gone.

But you can see that this crate has a lot of life left. So have the other eleven. So have thousands of other pieces of Monel pickling equipment used by the iron and steel industry . . . racks, baskets, chains, hooks, stay-rods, and bands.

That is why it is safe to say that Monel is probably the most economical alloy you could use in most kinds of pickling equipment. A little Monel goes a long way. You can make it any shape you want easily. It lasts a long time.

To get more information on places to use Monel in pickling send for the free booklet, "Five Way Savings . . . in Pickling."

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EQUIPMENT**

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November 19, 1953

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# *The Iron Age*

## SEMI-ANNUAL INDEX

<sup>OCT</sup>  
**July - December - 1953**

**Volume 172**

### READERSHIP RESEARCH

THE IRON AGE retains The Eastman Research Organization to make a continuing study of its readership. This is done by a field force which interviews readers who hold various positions in many different types of companies. These detailed reports help keep us abreast of reader interest. They tell us what readers like or dislike; what subjects they would like to see emphasized; and they help us to improve the appearance of the magazine. In short, they are part of our effort to make THE IRON AGE more valuable to the reader.

—THE EDITORS.

*The Iron Age*

A CHILTON  PUBLICATION

100 East 42nd Street, New York 17, N. Y.

# Iron and Steel Scrap Markets

## Revise Steelmaking Scrap Specs

**AISI, ISIS committees develop new specs for most steelmaking grades . . . Effective Jan. 1, 1954 . . . But consumers probably will accept old orders on former basis until Feb. 1.**

Specifications for principal grades of openhearth scrap have been revised effective Jan. 1, 1954. Changes were made following conferences between committees representing American Iron and Steel Institute and Institute of Scrap Iron & Steel. Committee members believe most consumers will accept scrap after Jan. 1 on old orders prepared against former specifications until Feb. 1, 1954.

**No. 1 Heavy Melting**—Clean wrought iron or carbon steel scrap  $\frac{1}{4}$  in. and over in thickness, not over 18 in. wide nor over 5 ft long. Individual pieces must be free from attachments, cut to lie flat in the charging box. May include new mashed pipe ends, 4 in. and over.

**No. 2 Heavy Melting**—Wrought iron or carbon steel scrap, black or galvanized,  $\frac{1}{4}$  in. and over in thickness, not over 18 in. wide nor over 3 ft long. Individual pieces must be free from attachments, cut to lie flat in the charging box. May include pipe cut 3 ft and under. May not include automobile body, fender stock.

**No. 2 Bundles**—Body and fender carbon steel scrap, or old black and/or galvanized carbon steel scrap, hydraulically compressed to charging box size and weighing not less than 75 lb per cu ft. May not include turnings, beadwire, vitreous enameled stock, tin cans, tinplate, ferrous plate or other metal coated material. Painted or lacquered material shall not be considered as metal coated material. May include hydraulically compressed black or galvanized fence wire and light coil springs.

**No. 3 Bundles**—Off-grade material, compressed to charging box size and weighing not less than 75 lb per cu ft. May include tin cans; tinned, galvanized, vitreous enameled and other coated ferrous scrap not suitable for inclusion in No. 2 bundles. Must be free of dirt, nonferrous metals, non-metallics.

**Incinerator Bundles**—Tin can scrap, compressed to charging box size and weighing not less than 75 lb per cu ft. Must have been processed through a recognized garbage incinerator. Must be free of dirt, nonferrous metals, non-metallics.

**Pittsburgh**—Market tone is weak in absence of new business and sale of a small tonnage at lower prices in a nearby market. Prices of openhearth scrap held unchanged, but low phos and railroad material dropped on appraisal. Turnings also are weaker. Shutdown of four marginal openhearth by Jones & Laughlin Steel Corp. last week end struck another blow at sales prospects in this district.

**Chicago**—Confused by buyer resistance to price increases and dealer resistance to decreases, Chicago brokers were bloody and a little bowed last week. The market gave some indica-

tion of leveling off with old price differentials returning. Sales were very spotty, and the broker-dealer activity of previous weeks had fallen off. A few sales of No. 1 steelmaking grades were reported at \$35, which put that item's price at \$33 to \$35. No. 2 grades were holding steady, but brokers were slow picking up scrap at last week's dealer prices.

**Philadelphia**—Dealers report it is almost impossible to get orders from local mills. Tonnages are small to moderate on what trading is being done. While prices this week are largely unchanged, trade consensus is that the only way they can go is down. Backing this up, they point to increasing number of idle furnaces in the area and say, "Large stockpiles look even bigger with a dipping ingot rate."

**New York**—Yard workers' strike was still in progress at press time, with resultant slowing of movement. But settlement was expected this week. Meanwhile a steadying of the market brought some slight price readjustments. Steelmaking grades were 50¢ to \$1 under last week's quotations, while turnings were up about \$1 generally.

**Detroit**—The market continues practically unchanged here, but without sufficient buying to generate any feeling of optimism. Some recent Lake movement of turnings has ceased, leaving them a soft item again. A major buyer has indicated he will buy No. 1 bundles, but at a figure somewhat less than the prevailing price. There were no immediate takers, but it indicates his opinion of the market.

**Cleveland**—Scrap traders here are divided into two camps. Optimists say mills will have to come in before the first of the year. Pessimists can't see any year-end buying. While debate rages prices have leveled off. Sale of a small tonnage of No. 1 steel

at \$34 has been unanimously discounted as not representative. Low phos plate dipped \$1 to \$40 in the Valley on the basis of an offer to buy.

**Birmingham**—No southern steel mills were in the market for scrap this week and brokers report orders from northern mills were quite small. Dealers seem about as reluctant to sell as mills are to buy and some first of the month orders are still unfilled. Some No. 2 bundles are moving from the Carolinas into Alabama, which is not normal. The cast market is still tight. There is a good demand but supplies are scarce. Many Florida dealers are turning down all orders except for cast.

**St. Louis**—Nothing has happened to warrant any changes in scrap prices here. Mills have issued no new buying orders, because inventories are ample, but they have been accepting offers from regular sources. Brokers in turn have been buying from their regular sources on this basis.

**Cincinnati**—There is a quiet undercurrent of uneasiness here. November orders are still being filled but otherwise market activity is at a standstill. Sentiment generally points to limited local consumption in December at lower prices.

**Buffalo**—Steady to slightly easier tendencies are noted in scrap here. A 7 point break in the ingot rate is a bearish factor but prices are nominally unchanged. Dealers are shipping against large orders placed within prevailing ranges.

**Boston**—While steelmaking scrap remained unchanged this week, there was much confusion in the New England trade. A little demand exists and a price change is expected—but nobody will guess which way. Cast prices moved up but there isn't much demand for these grades. Blast furnace material is also quoted higher this week.

**West Coast**—Renewed buying at top of range in Seattle area has given steel scrap market noticeable lift. In California, coast market taking all available tonnage due to end of strike by pipe-making firm and slightly improved foundry activity. No price changes.

# FIRST

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Good scrap, properly segregated, is a valuable commodity. But good scrap mixed with contaminating materials is subject to rejection by the mills. Segregate types and grades carefully so that every ton of your scrap will return every possible dollar.

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CONVERTERS  
& DEALERS  
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# Scrap Prices

(Effective Nov. 17, 1953)

## Pittsburgh

No. 1 hvy. melting	\$37.00 to \$38.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	37.00 to 38.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and ms. turns	20.00 to 21.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. punch'gs, plate	41.00 to 42.00
Heavy turnings	32.00 to 33.00
No. 1 RR. hvy. melting	40.50 to 41.50
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	50.00 to 51.00
RR. steel wheels	42.50 to 43.50
RR. spring steel	42.50 to 43.50
RR. couplers and knuckles	42.50 to 43.50
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	34.00 to 35.00
Malleable	42.00 to 43.00

## Chicago

No. 1 hvy. melting	\$33.00 to \$35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 factory bundles	35.00 to 37.00
No. 1 dealers' bundles	33.00 to 35.00
No. 2 dealers' bundles	27.00 to 28.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 19.00
Low phos. forge crops	40.00 to 41.00
Low phos. punch'gs, plate	37.00 to 38.00
Low phos. 3 ft and under	37.00 to 37.50
No. 1 RR. hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	40.00 to 41.00
Re-rolling rails	46.00 to 47.50
Rails 2 ft and under	48.00 to 49.00
Locomotive tires, cut	38.00 to 40.00
Cut bolsters & side frames	39.00 to 41.00
Angles and splice bars	40.00 to 41.00
RR. steel car axles	46.00 to 47.00
RR. couplers and knuckles	39.00 to 40.00
No. 1 machinery cast.	38.00 to 40.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Cast iron brake shoes	35.00 to 37.00
Cast iron car wheels	35.00 to 37.00
Malleable	40.00 to 42.00
Stove plate	28.00 to 30.00

## Philadelphia Area

No. 1 hvy. melting	\$34.00 to \$35.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	29.00 to 30.00
Machine shop turn.	20.00 to 21.00
Mixed bor., short turn.	22.00 to 23.00
Shoveling turnings	26.00 to 27.00
Clean cast chem. borings	29.00 to 30.00
Low phos. 5 ft and under	36.00 to 38.00
Low phos. 2 ft and under	37.00 to 39.00
Low phos. punchings	38.00 to 40.00
Elec. furnace bundles	35.00 to 36.00
Heavy turnings	32.00 to 33.00
RR. steel wheels	41.00 to 42.00
RR. spring steel	41.00 to 42.00
Rails 18 in. and under	46.00 to 48.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	42.00 to 43.00
Malleable	42.00 to 43.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	41.00 to 43.00
Charging box cast.	37.00 to 38.00

## Cleveland

No. 1 hvy. melting	\$24.00 to \$35.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. 3 ft and under	37.00 to 38.00
Drop forge flashings	34.00 to 35.00
No. 1 RR. heavy melting	38.00 to 39.00
Rails 3 ft and under	48.00 to 49.00
Rails 18 in. and under	50.00 to 51.00
Railroad grate bars	33.00 to 34.00
Steel axle turnings	30.00 to 31.00
Railroad cast.	46.00 to 47.00
No. 1 machinery cast.	45.00 to 46.00
Stove plate	35.00 to 36.00
Malleable	45.00 to 46.00

## Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

## Youngstown

No. 1 hvy. melting	\$37.00 to \$38.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	37.00 to 38.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	25.00 to 26.00
Low phos. plate	39.00 to 40.00

## Buffalo

No. 1 hvy. melting	\$34.50 to \$35.00
No. 2 hvy. melting	31.00 to 31.50
No. 1 busheling	34.50 to 35.00
No. 1 bundles	34.50 to 35.00
No. 2 bundles	29.00 to 29.50
Machine shop turn.	21.50 to 22.50
Mixed bor. and turn.	23.50 to 24.50
Shoveling turnings	21.50 to 23.50
Cast iron borings	23.50 to 24.50
Low phos. plate	38.00 to 39.00
Scrap rails, random lgth.	39.00 to 40.00
Rails 2 ft and under	44.00 to 45.00
RR. steel wheels	42.00 to 43.00
RR. spring steel	42.00 to 43.00
RR. couplers and knuckles	42.00 to 43.00
No. 1 machinery cast.	39.00 to 40.00
No. 1 cupola cast.	34.00 to 35.00

## Detroit

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$28.00 to \$29.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 bundles, openhearth	29.00 to 30.00
No. 2 bundles	22.00 to 23.00
New busheling	28.00 to 29.00
Drop forge flashings	28.00 to 29.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Electric furnace bundles	29.00 to 30.00
Low phos. punch'gs, plate	30.00 to 31.00
No. 1 cupola cast.	36.00
Heavy breakable cast.	27.00
Stove plate	30.00
Automotive cast.	38.00

## St. Louis

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundled sheets	32.00 to 33.00
No. 2 bundled sheets	27.00 to 28.00
Machine shop turn.	14.00 to 15.00
Cast iron borings	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
No. 1 RR. hvy. melting	37.00 to 38.00
Rails, random lengths	40.00 to 42.00
Rails 18 in. and under	46.00 to 47.00
Locomotive tires, uncut	35.00 to 36.00
Angles and splice bars	36.00 to 37.00
Std. steel car axles	40.00 to 41.00
RR. spring steel	37.00 to 38.00
Cupola cast.	38.00 to 39.00
Hvy. breakable cast.	32.00 to 33.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	36.00 to 37.00
Cast iron car wheels	35.00 to 36.00
Malleable	37.00 to 39.00
Unstripped motor blocks	28.00 to 29.00

## New York

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$27.00 to \$28.00
No. 2 hvy. melting	24.50 to 25.50
No. 2 bundles	22.50 to 23.50
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	19.00 to 20.00
Clean cast chem. borings	25.00 to 26.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 31.00
Charging box cast.	29.00 to 31.00
Heavy breakable cast.	29.00 to 31.00
Unstripped motor blocks	22.00 to 23.00

## Birmingham

No. 1 hvy. melting	\$27.00 to \$28.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	27.00 to 28.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	27.00 to 28.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	20.50 to 21.50
Cast iron borings	20.50 to 21.50
Electric furnace bundles	28.00 to 28.50
Bar crops and plate	35.00 to 36.00
Structural and plate, 2 ft.	35.00 to 36.00
No. 1 RR. hvy. melting	30.00 to 30.50
Scrap rails, random lgth.	34.00 to 35.00
Rails, 18 in. and under	41.00 to 42.00
Angles & splice bars	39.00 to 40.00
Std. steel axles	35.00 to 36.00
No. 1 cupola cast.	41.00 to 42.00
Stove plate	38.00 to 39.00
Cast iron car wheels	34.00 to 35.00
Charging box cast.	24.00 to 25.00
Heavy breakable	25.00 to 26.00
Unstripped motor blocks	32.00 to 33.00
Mashed tin cans	15.00 to 16.00

## Boston

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$25.00
No. 2 hvy. melting	\$21.00 to 21.25
No. 1 bundles	25.00
No. 2 bundles	19.00 to 19.25
No. 1 busheling	25.00 to 25.50
Elec. furnace, 3 ft & under	26.00
Machine shop turn.	13.50
Mixed bor. and short turn.	16.00 to 16.50
Shoveling turnings	17.00 to 17.50
Clean cast chem. borings	18.00 to 19.00
No. 1 machinery cast.	29.00 to 31.00
Mixed cupola cast.	24.00 to 25.00
Heavy breakable cast.	29.00
Stove plate	22.50 to 23.50
Unstripped motor blocks	18.00 to 18.50

## Cincinnati

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$31.00 to \$32.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. 18 in. & under	39.00 to 40.00
Rails, random lengths	29.00 to 40.00
Rails, 18 in. and under	48.00 to 49.00
No. 1 cupola cast.	37.00 to 38.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	46.00 to 47.00

## San Francisco

No. 1 hvy. melting	\$23.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
No. 3 bundles	15.00
Machine shop turn.	7.00
Cast iron borings	11.00
No. 1 RR. hvy. melting	23.00
No. 1 cupola cast.	39.00

## Los Angeles

No. 1 hvy. melting	\$23.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
No. 3 bundles	15.00
Mach. shop turn.	7.00
Shoveling turnings	9.00 to 11.00
Cast iron borings	9.00 to 11.00
Elec. fur. 1 ft and under	28.00
No. 1 RR. hvy. melting	23.00
No. 1 cupola cast.	39.00 to 40.00

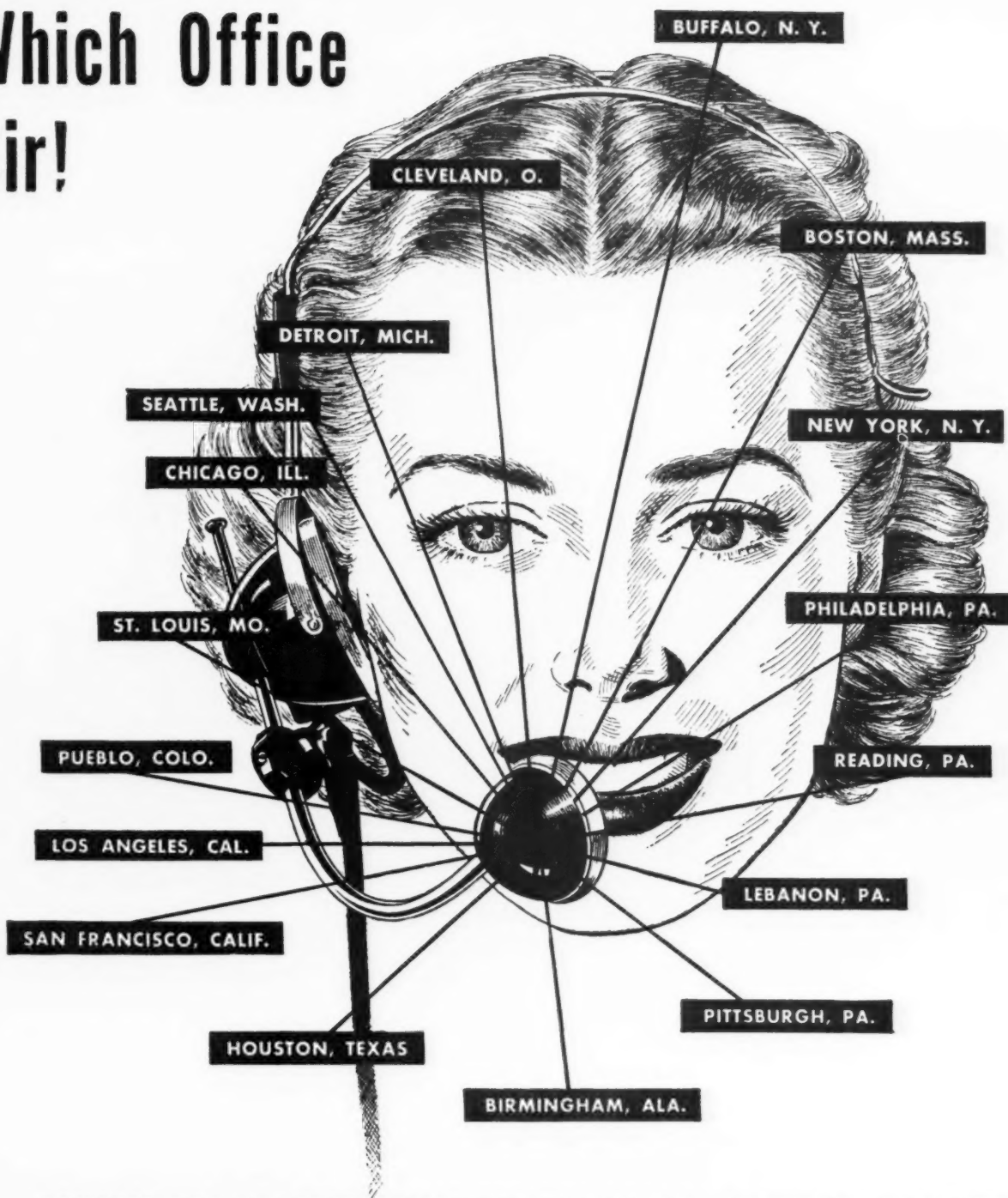
## Seattle

No. 1 hvy. melting	\$29.00
No. 2 hvy. melting	\$27.00 to 35.00
No. 1 bundles	26.00
No. 2 bundles	19.00
No. 1 cupola cast.	37.00
Mixed yard cast.	35.00

## Hamilton Ont.

No. 1 hvy. melting	\$32.00
No. 1 bundles	32.50
No. 2 bundles	32.00
Mechanical bundles	30.50
Mixed steel scrap	28.50
Bushelings	27.50
Bush., new fact. prep'd.	30.50
Bush., new fact. unprep'd.	29.50
Short steel turnings	22.50
Mixed bor. and turn.	22.50
Rails, remelting	32.50
Rails, re-rolling	41.80
Cast scrap	46.00

# Which Office Sir!



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CHICAGO, ILLINOIS LOS ANGELES, CAL. ST. LOUIS, MO.  
CLEVELAND, OHIO NEW YORK, N. Y. SAN FRANCISCO, CAL.  
SEATTLE, WASH.

## LEADERS IN IRON AND STEEL SCRAP SINCE 1889

November 19, 1953

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# Comparison of Prices

(Effective Nov. 17, 1953)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Nov. 17 1953	Nov. 10 1953	Oct. 20 1953	Nov. 18 1952
<b>Flat-Rolled Steel: (per pound)</b>				
Hot-rolled sheets	3.925¢	3.925¢	3.925¢	3.775¢
Cold-rolled sheets	4.775	4.775	4.775	4.675
Galvanized sheets (10 ga.)	5.275	5.275	5.275	5.075
Hot-rolled strip	3.925	3.925	3.925	3.725
Cold-rolled strip	5.513	5.575	5.575	5.20
Plate	4.10	4.10	4.10	3.90
Plates wrought iron	9.30	9.30	9.30	9.00
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	36.75*
<b>Tin and Terneplate: (per base box)</b>				
Tinplate (1.50 lb.) cokes	\$8.95	\$8.95	\$8.95	\$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. ternes	7.75	7.75	7.75	7.75
<b>Bars and Shapes: (per pound)</b>				
Merchant bars	4.15¢	4.15¢	4.15¢	3.95¢
Cold finished bars	5.20	5.20	5.20	4.925
Alloy bars	4.875	4.875	4.875	4.675
Structural shapes	4.10	4.10	4.10	3.85
Stainless bars (No. 302)	35.50	35.50	35.50	31.50
Wrought iron bars	10.40	10.40	10.40	10.05
<b>Wire: (per pound)</b>				
Bright wire	5.525¢	5.525¢	5.525¢	5.226¢
<b>Rails: (per 100 lb.)</b>				
Heavy rails	\$4.325	\$4.325	\$4.325	\$3.775
Light rails	5.20	5.20	5.20	4.25
<b>Semifinished Steel: (per net ton)</b>				
Re-rolling billets	\$62.00	\$62.00	\$62.00	\$59.00
Slabs, re-rolling	62.00	62.00	62.00	59.00
Forging billets	75.50	75.50	75.50	70.50
Alloy blooms, billets, slabs	82.00	82.00	82.00	76.00
<b>Wire Rod and Skelp: (per pound)</b>				
Wire rods	4.525¢	4.525¢	4.525¢	4.325¢
Skelp	3.75	3.75	3.75	3.55
<b>Finished Steel Composite: (per pound)</b>				
Base price	4.632¢	4.634¢	4.634¢	4.376¢

\* Add 4.7 pct.

## Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips.

## PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	
Birmingham R3	52.38	52.88			
Birmingham W9	52.38	52.88			
Birmingham S5	52.38	52.88			
Buffalo R3	56.00	56.50	57.00		
Buffalo H1	56.00	56.50	57.00		
Buffalo W6	56.00	56.50	57.00		
Chicago I4	56.00	56.50	57.00		
Cleveland A5	56.00	56.50	57.00		
Cleveland R3	56.00	56.50	57.00	61.00	
Dainierfield L3	52.50	52.50	52.50		
Duluth I4	56.00	56.50	57.00		
Erie I4	56.00	56.50	57.00		
Everett M6	56.00	56.50	57.00		
Fontana K1	62.00	63.00	63.50		
Geneva, Utah C7	56.00	56.50	57.00		
Granite City G2	57.90	58.40	58.90		
Hubbard Y1	56.00	56.50	57.00		
Minneapolis C6	56.00	56.50	57.00		
Monessen P6	56.00	56.50	57.00		
Neville Isl. P4	56.00	56.50	57.00		
Pittsburgh U1	56.00	56.50	57.00		
Sharpville S3	56.00	56.50	57.00		
Steelton B3	58.00	58.50	59.00	59.50	64.00
Swedeland A2	58.00	58.50	59.00	59.50	
Toledo I4	56.00	56.50	57.00		
Troy, N. Y. R3	58.00	58.50	59.00	59.50	64.00
Youngstown Y1	56.00	56.50	57.00		
N. Tonawanda T1	56.00	56.50	57.00		

**DIFFERENTIALS:** Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over.

**Silvery Iron:** Buffalo, H1, \$68.25; Jackson, J1, G1, \$67.00. Add \$1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add \$1 per ton for 0.75 pct or more phosphorus. Manganese as above Bessemer ferrosilicon prices are \$1 over comparable silvery iron.

	Nov. 17 1953	Nov. 10 1953	Oct. 20 1953	Nov. 18 1952
<b>Pig Iron: (per gross ton)</b>				
Foundry, del'd Phila.	\$61.19	\$61.19	\$61.19	\$60.69
Foundry, Valley	56.50	56.50	56.50	55.00
Foundry, Southern, Cin'ti	60.43	60.43	60.43	58.93
Foundry, Birmingham	52.88	52.88	52.88	51.38
Foundry, Chicago†	56.50	56.50	56.50	55.00
Basic del'd, Philadelphia	60.27	60.27	60.27	59.77
Basic, Valley furnace	56.00	56.00	56.00	54.50
Malleable, Chicago†	56.50	56.50	56.50	55.00
Malleable, Valley	56.50	56.50	56.50	55.00
Ferromanganese, cents per lb.	10.00¢	10.00¢	10.00¢	8.06¢

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.

‡ Average of U. S. Prices quoted on Ferroalloy pages, 76 pct Mn basis.

<b>Pig Iron Composite: (per gross ton)</b>				
Pig iron	\$56.59	\$56.59	\$56.59	\$55.26

<b>Scrap: (per gross ton)</b>				
No. 1 steel, Pittsburgh	\$37.50	\$37.50	\$35.50	\$43.00*
No. 1 steel, Phila. area	34.50	34.50	31.50	41.50*
No. 1 steel, Chicago	34.00	34.00	31.50	41.50*
No. 1 bundles, Detroit	29.50	29.50	27.50	41.15*
Low phos., Youngstown	39.50	40.50	37.50	46.50*
No. 1 mach'y cast, Pittsburgh	45.50	45.50	43.50	52.00
No. 1 mach'y cast, Philadel'a.	42.00	42.00	41.00	52.00†
No. 1 mach'y cast, Chicago	39.00	39.00	37.00	47.25

\* Basing pt., less broker's fee. † Shipping pt., less broker's fee.

<b>Steel Scrap Composite: (per gross ton)</b>				
No. 1 heavy melting scrap	\$35.33	\$35.33	\$32.83	\$42.00

<b>Coke, Connellsville: (per net ton at oven)</b>				
Furnace coke, prompt	\$14.38	\$14.38	\$14.38	\$14.75
Foundry coke, prompt	17.25	17.25	17.25	17.75

<b>Nonferrous Metals: (cents per pound to large buyers)</b>				
Copper, electrolytic, Conn.	29.75†	29.75†	29.50†	24.50
Copper, Lake, Conn.	30.125	30.125	30.125	24.625
Tin, Straits, New York	82.50†	81.75*	80.25	121.1¼
Zinc, East St. Louis	10.00	10.00	10.00	12.50
Lead, St. Louis	13.30	13.30	13.30	14.30
Aluminum, virgin ingot	21.50	21.50	21.50	20.00
Nickel, electrolytic	63.08	63.08	63.08	59.58
Magnesium, ingot	27.00	27.00	27.00	24.50
Antimony, Laredo, Tex.	34.50	34.50	34.50	34.50

† Tentative. ‡ Average. \* Revised.

## Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

## Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

## STAINLESS STEELS

Base price cents per lb., f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingot, re-rolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00		14.25
Slabs, billets, re-rolling	20.50-20.75	22.75	24.75	23.75	36.25	29.50	32.25	18.25		18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50-46.75	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	59.00	45.75-46.00	51.25	30.00	30.50-31.00	30.50
Sheets	46.25	46.50	48.75	48.75	64.50	55.50	60.75	40.75	41.25	43.50
Strip, hot-rolled	29.75	32.00	36.75	34.25	55.00	42.00	46.50	26.25		27.00
Strip, cold-rolled	58.25	41.50	45.50	43.75	66.50	54.50	59.25	34.25	41.25	34.75

**STAINLESS STEEL PRODUCING POINTS—Sheets:** Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2; J2; Baltimore, El; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, J4; Lockport, N. Y., R4.

**Strip:** Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C5; Lockport, N. Y., S4; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., W1 (25¢ per lb. higher); New Bedford, Mass., R6.

**Bars:** Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Lockport, N. Y., S4; Canton, O., T5; Ft. Wayne, J4.

**Wire:** Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

**Structurals:** Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

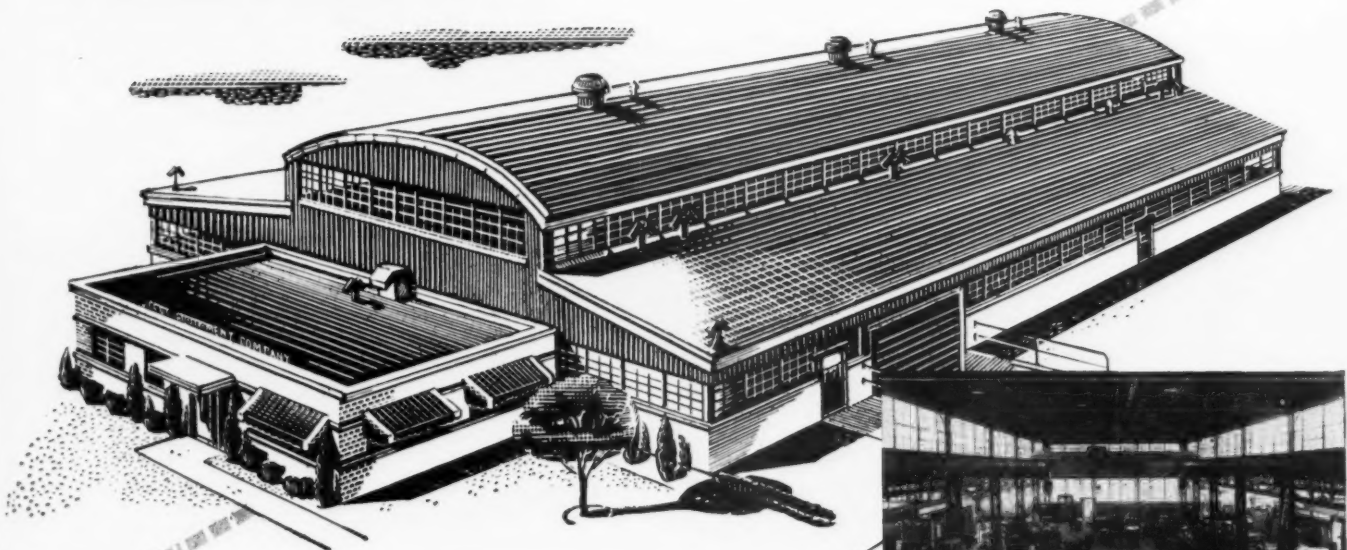
**Plates:** Brackenridge, Pa., A3; Butler, Pa., A7; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Lockport, N. Y., S4; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3.

**Forged discs, die blocks, rings:** Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

**Forging billets:** Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

# SECO

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*Designs and custom-builds*

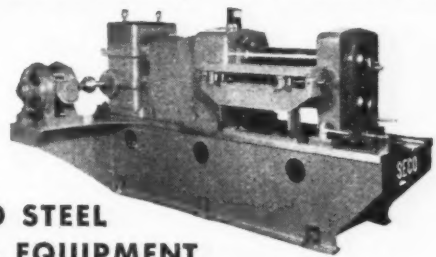
## EFFICIENT SLITTING LINES

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Every facility for custom building efficient slitting lines and cold-rolled strip mill equipment is in the new SECO plant. More and more leading manufacturers are turning to SECO for precision equipment that gives outstanding performance.

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### STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION  
CLEVELAND 22, OHIO

# SECO

## IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

**STEEL  
PRICES**(Effective  
Nov. 17, 1953)

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PIL- ING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Re-rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					\$82.00 B3			4.15 B3	6.20 B3				
	Buffalo, N. Y.			\$62.00 B3	\$75.50 B3, R3	\$82.00 B3, R3		4.925 B3	4.15 B3	6.20 B3	3.925 B3, R3	5.45 B3	6.00 B3	8.425 B3
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.										4.05 A2		5.90 A2	
	New Bedford, Mass.											6.40 R6		
	Hartford, Conn.													
	Johnstown, Pa.			\$62.00 B3	\$75.50 B3	\$82.00 B3			4.15 B3	6.20 B3				
	Morrisville, Pa.													
	New Haven, Conn.											5.95 A5 6.20 D1		
	Phoenixville, Pa.								4.95 P2					
	Sparrows Pt. Md.										3.925 B3	5.45 B3	6.00 B3	8.425 B3
	Wallingford, Conn.											6.20 W1		
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										4.10 L1			
	Ashland, Ky.										3.925 A7			
	Canton-Massillon, Dover, Ohio				\$75.50 R3	\$82.00 R3								
	Chicago, Ill.			\$62.00 U1	\$75.50 R3, U1, W8	\$82.00 U1, W8, R3		4.925 U1	4.10 U1, W8	6.175 U1, Y1	3.925 A1, W8	5.70 A1	5.95 R3	
	Sterling, Ill.													
	Cleveland, Ohio				\$75.50 R3							5.45 A5, J3		7.80 J3 8.15 A5
	Detroit, Mich.		\$63.00 R5		\$78.50 R5	\$84.00 R5					4.125 G3 4.15 M2	5.65 G3, M2 5.70 D1, P11, D2	6.15 G3	7.90 D2 8.35 G3
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			\$62.00 U1	\$75.50 U1	\$82.00 U1, Y1		4.925 I3	4.10 I3, U1	6.175 U1, I3	3.925 I3, U1, Y1	5.70 I3	5.95 U1, I3 6.45 Y1	
	Granite City, Ill.													
	Kokomo, Ind.													
	Mansfield, Ohio													
	Middletown, Ohio											5.45 A7		
	Niles, Ohio Sharon, Pa.										3.925 S1	5.45 S1	5.95 A1	7.65 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$59.00 U1	\$62.00 U1, C11	\$62.00 U1, J3	\$75.50 J3, U1	\$82.00 U1, C11	3.75 U1 3.85 J3	4.925 U1	4.10 J3, U1	6.175 J3, U1	3.925 A7, P6 4.15 S7 4.425 S9	5.45 B4, J3 5.75 S7		7.80 J3
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								4.35 W3		4.025 W3	5.45 F3, W3	6.30 W3	8.30 W3
	Youngstown, Ohio					\$82.00 Y1, C10	3.75 R3, U1		4.10 Y1	6.675 Y1	3.925 R3, U1, Y1	5.45 R3, Y1 5.95 C5	5.95 U1, R3 6.45 Y1	7.60 R3 8.30 Y1
WEST	Fontana, Cal.	\$86.00 K1	\$88.00 K1	\$70.00 K1	\$83.50 K1	\$101.00 K1			4.75 K1	6.825 K1	4.70 K1	7.35 K1	7.05 K1	
	Geneva, Utah				\$75.50 C7				4.10 C7	6.175 C7				
	Kansas City, Mo.								4.80 S2	6.875 S2	4.625 S2		6.65 S2	
	Los Angeles, Torrance, Cal.				\$94.50 B2	\$102.00 B2			4.80 B2, C7	6.85 B2	4.675 B2, C7	7.50 C1		
	Minnequa, Colo.								4.55 C6		4.025 C6			
	San Francisco, Niles, Pittsburg, Cal.				\$94.50 B2				4.75 B2 4.91 P9	6.80 B2	4.675 B2, C7			
	Seattle, Wash.				\$94.50 B2, S11				4.85 B2	6.90 B2				
SOUTH	Atlanta, Ga.										4.175 A8			
	Fairfield, Ala. Alabama City, Ala.			\$62.00 T2	\$75.50 T2				4.10 R3, T2	6.175 T2	3.925 R3, T2		5.95 T2	
	Houston, Texas				\$85.50 S2	\$92.00 S2			4.60 S2		4.425 S2			

*Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.*

IRON AGE

# STEEL PRICES

(Effective Nov. 17, 1953)

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	STEEL PRICES (Effective Nov. 17, 1953)
Hot-rolled 18 ga. & hvyr.	Cold- rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 1.25-lb. base box	Holloware Enameling 29 ga.	
					5.90 B3	7.225 B3			4.525 W6				Bethlehem, Pa.
3.925 B3	4.775 B3												Buffalo, N. Y.
													Claymont, Del.
													Coatesville, Pa.
4.05 A2					5.90 A2						† Special coated mfg. terne deduct 95c from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct \$2.20 from 1.25-lb coke base box. * COKES: 1.50-lb add 25c. ELECTRO: 0.50-lb add 25c; 0.75-lb add 65c.		Conshohocken, Pa.
									4.525 B3				Harrisburg, Pa.
4.025 U1	4.875 U1									\$8.80 U1	\$7.50 U1	6.60 U1	Hartford, Conn.
													Johnstown, Pa.
													Morrisville, Pa.
													New Haven, Conn.
													Phoenixville, Pa.
3.925 B3	4.775 B3	5.275 B3			5.90 B3	7.225 B3	8.075 B3		4.625 B3	\$8.80 B3	\$7.50 B3		Sparrows Pt., Md.
									4.825 A5				Worcester, Mass.
													Trenton, N. J.
									4.70 L1				Alton, Ill.
3.925 A7		5.275 A7	5.175 A7										Ashland, Ky.
		5.275 R3 5.525 R1						5.825 R1					Canton-Massillon, Dover, Ohio
3.925 A1, W8					5.90 U1				4.525 A5, N4, R3				Chicago, Joliet, Ill.
									4.625 N4				Sterling, Ill.
3.925 J3, R3	4.775 J3, R3		5.175 R3		5.90 J3, R3	7.225 J3, R3			4.525 A5				Cleveland, Ohio
4.125 G3 4.15 M2	4.975 G3				6.10 G3	7.425 G3							Detroit, Mich.
3.925 N5													Newport, Ky.
3.925 J3, U1, Y1	4.775 J3, U1, Y1	5.275 U1 5.325 J3	5.175 J3, U1	5.675 U1	5.90 U1, J3 6.40 Y1	7.225 U1 7.725 Y1				\$8.70 J3, U1, Y1	\$7.40 J3, U1	6.10 U1, Y1	Gary, Ind. Harbor, Indiana
4.125 G2	4.975 G2	5.475 G2	5.875 G2								\$7.60 G2	6.30 G2	Granite City, Ill.
4.925 C9		5.375 C9											Kokomo, Ind.
				6.25 E2				5.80 E2					Mansfield, Ohio
	4.775 A7		5.175 A7	5.675 A7									Middletown, Ohio
3.925 S1 5.175 N3	5.80 N3	5.275 N3	6.525 N3	5.45 S1 5.675 N3	5.90 S1						\$7.40 R3		Niles, Ohio Sharon, Pa.
3.925 J3, U1, P6, A7	4.775 J3, U1, P6	5.275 U1	5.175 U1		5.90 J3, U1	7.225 J3, U1	7.925 U1		4.525 A5 4.725 P6	\$8.70 J3, U1	\$7.40 J3, U1	6.10 U1	Pittsburgh, Pa. Midland, Pa. Butler, Pa.
									4.525 P7				Portsmouth, Ohio
3.925 W3, W5	4.775 W3, W5 5.775 F3	5.275 W3, W5		5.675 W3, W5	6.175 W3	7.475 W3				\$8.70 W3, W5	\$7.40 W3, W5	6.55 W5 6.10 F3	Weirton, Wheeling, Follansbee, W. Va.
3.925 R3, U1, Y1	4.775 R3, Y1				5.90 U1, R3 6.40 Y1	7.225 R3 7.725 Y1			4.525 Y1	\$8.70 R3			Youngstown, Ohio
4.70 K1	5.875 K1				7.00 K1	8.275 K1			5.325 K1				Fontana, Cal.
4.025 C7													Geneva, Utah
								4.775 C6	4.865 S2				Kansas City, Mo.
4.625 C7		6.275 C7							5.325 B2				Los Angeles, Torrance, Cal.
									4.775 C6				Minnequa, Colo.
4.625 C7	5.725 C7	6.025 C7							5.175 C7	\$9.45 C7	\$8.15 C7		San Francisco, Niles Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.925 R3, T2	4.775 T2	5.275 R3, T2			5.90 T2			5.125 T2 5.225 R3	4.525 T2 R3	\$8.80 T2	\$7.50 T2		Fairfield, Ala. Alabama City, Ala.
4.425 S2									4.925 S2				Houston, Texas

**STEEL PRICES**(Effective  
Nov. 17, 1953)

STEEL PRICES <i>(Effective Nov. 17, 1953)</i>		BARS					PLATES				WIRE	
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'r's. Bright
EAST	Bethlehem, Pa.				4.875 B3	6.325 B3	6.225 B3					
	Buffalo, N. Y.	4.15 B3,R3	4.15 B3,R3	5.25 B5	4.875 B3,R3	6.325 B3,B5	6.225 B3	4.10 B3			6.25 B3	5.525 W6
	Claymont, Del.							4.55 C4		5.65 C4		
	Coatesville, Pa.							4.35 L4		5.75 L4		
	Conshohocken, Pa.							4.25 A2	5.15 A2		6.25 A2	
	Harrisburg, Pa.							4.10 C3				
	Hartford, Conn.			5.75 R3		6.775 R3						
	Johnstown, Pa.	4.15 B3	4.15 B3		4.875 B3		6.225 B3	4.10 B3		5.55 B3	6.25 B3	5.525 B3
	Morrisville	4.30 U1	4.30 U1									
	Newark, N. J.			5.65 W10		6.65 W10						
	New Haven, Conn.											
	Camden, N. J.			5.65 P10		6.50 P10						
	Putnam, Conn.			5.75 W10								
	Sparrows Pt., Md.		4.15 B3					4.10 B3		5.55 B3	6.25 B3	5.625 B3
	Palmer, Worcester, Mansfield, Mass.			5.75 B5 6.10 W11		6.775 B5						5.825 A5, W6
	Readville, Mass.			5.75 C14								
MIDDLE WEST	Alton, Ill.	4.35 L1										5.70 L1
	Ashland, Ky.							4.10 A7				
	Canton-Massillon, Ohio	4.15 R3		5.20 R2,R3	4.875 R3	6.325 R2,R3						
	Chicago, Joliet, Ill.	4.15 R3, U1, N4, W8	4.15 R3, N4	5.20 A5, W10, W8, B5, L2	4.875 U1, W8, R3	6.375 A5, W8, W10, L2, R3, B5		4.10 U1, W8	5.15 U1	5.55 U1	6.25 U1	5.525 A1, R3, N4, W7
	Cleveland, Ohio	4.15 R3	4.15 R3	5.20 A5, C13		6.325 A5, C13		4.10 J3, R3	5.15 J3		6.25 J3	5.525 A5, R3, C13
	Detroit, Mich.	4.30 R5 4.35 G3		5.35 R5, P8 5.40 B5 5.45 P3	4.975 R5 5.075 G3	6.425 R5 6.475 P8 6.525 B5, P3		4.30 G3			6.45 G3	
	Duluth, Minn.											5.525 A5
	Gary, Ind. Harbor, Crawfordsville, Indiana	4.15 I3, U1, Y1	4.15 I3, U1, Y1	5.20 R3	4.875 I3, U1, Y1	6.325 R3, M5	6.275 U1, I3 6.725 Y1	4.10 I3, U1, Y1	5.15 I3	5.55 U1	6.25 U1, I3 6.75 Y1	5.625 M4
	Granite City, Ill.							4.30 G2				
	Kokomo, Ind.											5.625 C9
	Sterling, Ill.	4.25 N4	4.25 N4									5.625 N4
	Niles, Ohio Sharon, Pa.							4.10 S1		5.55 S1	6.25 S1	
	Pittsburgh, Pa. Midland, Pa.	4.15 J3, U1	4.15 J3, U1	5.20 A5, J3, W10, R3, C8	4.875 U1, C11	6.325 A5, C11, W10, C8	6.225 J3, U1	4.10 J3, U1	5.15 U1	5.55 U1	6.25 J3, U1	5.525 A5, J3, P6
	Portsmouth, Ohio											5.525 P7
	Weirton, Wheeling, Follansbee, W. Va.	4.30 W3						4.40 W3				
	Youngstown, Ohio	4.15 R3, U1, Y1	4.15 R3, U1, Y1	5.20 Y1, F2	4.875 U1, Y1, C10	6.325 Y1, C10, F2	6.225 U1 6.725 Y1	4.10 R3, U1, Y1			6.75 Y1	5.525 Y1
WEST	Emeryville, Cal.	4.90 J5	4.90 J5									
	Fontana, Cal.	4.85 K1	4.85 K1		5.925 K1		7.475 K1	4.75 K1		6.60 K1	6.95 K1	
	Geneva, Utah							4.10 C7			6.25 C7	
	Kansas City, Mo.	4.85 S2	4.85 S2		5.575 S2		6.925 S2					6.125 S2
	Los Angeles, Torrance, Cal.	4.85 B2, C7	4.85 B2, C7	6.65 R3	5.925 B2		6.925 B2					6.475 B2
	Minnequa, Colo.	4.60 C6	4.75 C6					4.95 C6				5.775 C6
	Portland, Ore.	4.90 O2										
	San Francisco, Niles, Pittsburg, Cal.	4.85 C7, P9 4.90 B2	4.85 C7, P9 4.90 B2				6.975 B2					6.475 C7
	Seattle, Wash.	4.90 B2, N6	4.90 B2, S11				6.975 B2	5.00 B2			7.15 B2	
	Atlanta, Ga.	4.40 A8	4.40 A8									5.775 A8
SOUTH	Fairfield, Ala. Alabama City, Ala.	4.15 R3, T2	4.15 R3, T2				6.225 T2	4.10 R3, T2			6.25 T2	5.525 R3, T2
	Houston, Texas Ft. Worth, Texas	4.65 S2	4.65 S2		5.375 S2		4.60 S2					5.925 S2

# Steel Prices

(Effective Nov. 17, 1953)

## Key to Steel Producers

With Principal Offices

- A1 Acme Steel Co., Chicago  
A2 Alan Wood Steel Co., Conshohocken, Pa.  
A3 Allegheny Ludlum Steel Corp., Pittsburgh  
A4 American Cladmetals Co., Carnegie, Pa.  
A5 American Steel & Wire Div., Cleveland  
A6 Angell Nail & Chaplet Co., Cleveland  
A7 Armco Steel Corp., Middletown, O.  
A8 Atlantic Steel Co., Atlanta, Ga.  
B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.  
B2 Bethlehem Pacific Coast Steel Corp., San Francisco  
B3 Bethlehem Steel Co., Bethlehem, Pa.  
B4 Blair Strip Steel Co., New Castle, Pa.  
B5 Bliss & Laughlin, Inc., Harvey, Ill.  
C1 Calstrip Steel Corp., Los Angeles  
C2 Carpenter Steel Co., Reading, Pa.  
C3 Central Iron & Steel Co., Harrisburg, Pa.  
C4 Claymont Products Dept., Claymont, Del.  
C5 Cold Metal Products Co., Youngstown  
C6 Colorado Fuel & Iron Corp., Denver  
C7 Columbia Geneva Steel Div., San Francisco  
C8 Columbia Steel & Shifting Co., Pittsburgh  
C9 Continental Steel Corp., Kokomo, Ind.  
C10 Copperweld Steel Co., Glassport, Pa.  
C11 Crucible Steel Co. of America, New York  
C12 Cumberland Steel Co., Cumberland, Md.  
C13 Cuyahoga Steel & Wire Co., Cleveland  
C14 Compressed Steel Shifting Co., Readville, Mass.  
D1 Detroit Steel Corp., Detroit  
D2 Detroit Tube & Steel Div., Detroit  
D3 Driver Harris Co., Harrison, N. J.  
D4 Dickson Weatherproof Nail Co., Evanston, Ill.  
E1 Eastern Stainless Steel Corp., Baltimore  
E2 Empire Steel Co., Mansfield, O.  
F1 Firth Sterling, Inc., McKeesport, Pa.  
F2 Fitzsimmons Steel Corp., Youngstown  
F3 Follansbee Steel Corp., Follansbee, W. Va.  
G1 Globe Iron Co., Jackson, O.  
G2 Granite City Steel Co., Granite City, Ill.

G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago

I3 Inland Steel Co., Chicago

I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.

J2 Jessop Steel Corp., Washington, Pa.

J3 Jones & Laughlin Steel Corp., Pittsburgh

J4 Joslyn Mfg. & Supply Co., Chicago

J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.

K2 Keystone Steel & Wire Co., Peoria

K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis

L2 La Salle Steel Co., Chicago

L3 Lone Star Steel Co., Dallas

L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.

M2 McLouth Steel Corp., Detroit

M3 Mercer Tube & Mfg. Co., Sharon, Pa.

M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.

M5 Monarch Steel Co., Inc., Hammond, Ind.

M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh

N2 National Tube Co., Pittsburgh

N3 Niles Rolling Mill Div., Niles, O.

N4 Northwestern Steel & Wire Co., Sterling, Ill.

N5 Newport Steel Corp., Newport, Ky.

N6 Northwest Steel Rolling Mills, Seattle

O1 Oliver Iron & Steel Co., Pittsburgh

O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.

P2 Phoenix Iron & Steel Co., Phoenixville, Pa.

P3 Pilgrim Drawn Steel Div., Plymouth, Mich.

P4 Pittsburgh Coke & Chemical Co., Pittsburgh

P5 Pittsburgh Screw & Bolt Co., Pittsburgh

P6 Pittsburgh Steel Co., Pittsburgh

P7 Portsmouth Div., Detroit Steel Corp., Detroit

P8 Plymouth Steel Co., Detroit

P9 Pacific States Steel Co., Niles, Cal.

P10 Precision Drawn Steel Co., Camden, N. J.

P11 Production Steel Strip Corp., Detroit

R1 Reeves Steel & Mfg. Co., Dover, O.

R2 Reliance Div., Eaton Mfg. Co., Massillon, O.

R3 Republic Steel Corp., Cleveland

R4 Roebbing Sons Co., John A., Trenton, N. J.

R5 Rotary Electric Steel Co., Detroit

R6 Rodney Metals, Inc., New Bedford, Mass.

S1 Sharon Steel Corp., Sharon, Pa.

S2 Sheffield Steel Corp., Kansas City

S3 Shenango Furnace Co., Pittsburgh

S4 Simonds Saw & Steel Co., Fitchburg, Mass.

S5 Sloss Sheffield Steel & Iron Co., Birmingham

S6 Standard Forging Corp., Chicago

S7 Stanley Works, New Britain, Conn.

S8 Superior Drawn Steel Co., Monaca, Pa.

S9 Superior Steel Corp., Carnegie, Pa.

S10 Sweet's Steel Co., Williamsport, Pa.

S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.

T2 Tennessee Coal & Iron Div., Fairfield

T3 Tennessee Products & Chem. Corp., Nashville

T4 Thomas Strip Div., Warren, O.

T5 Timken Steel & Tube Div., Canton, O.

T6 Tremont Nail Co., Wareham, Mass.

T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh

U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.

W2 Washington Steel Corp., Washington, Pa.

W3 Weirton Steel Co., Weirton, W. Va.

W4 Wheatland Tube Co., Wheatland, Pa.

W5 Wheeling Steel Corp., Wheeling, W. Va.

W6 Wickwire Spencer Steel Div., Buffalo

W7 Wilson Steel & Wire Co., Chicago

W8 Wisconsin Steel Co., S. Chicago, Ill.

W9 Woodward Iron Co., Woodward, Ala.

W10 Wyckoff Steel Co., Pittsburgh

W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

## PIPE AND TUBING

Base discounts (per) f.o.b. mills. Base price about \$200 per net ton.

	BUTTWELD												SEAMLESS											
	1/2 In.		3/4 In.		1 In.		1 1/4 In.		1 1/2 In.		2 In.		2 1/2-3 In.		2 In.		2 1/2 In.		3 In.		3 1/2-4 In.			
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
<b>STANDARD T. &amp; C.</b>																								
Sparrows Pt. B3	24.25	8.0	27.25	12.0	29.75	15.5	32.25	16.5	32.75	17.5	33.25	18.0	34.75	18.0										
Youngstown R3	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0										
Fontana K1	13.25	+2.0	16.25	1.0	18.75	4.5	21.25	5.5	21.75	6.5	22.25	7.0	23.75	7.0										
Pittsburgh J3	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5		
Alton, Ill. L1	24.25	8.0	27.25	12.0	29.75	15.5	32.25	17.0	32.75	17.5	33.25	18.0	34.75	17.5										
Sharon M3	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0										
Pittsburgh N1	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0										
Wheeling W5	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5		
Wheatland W4	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0										
Youngstown Y1	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5		
Indiana Harbor Y1	25.25	9.0	28.25	13.0	30.75	16.5	33.25	17.5	33.75	18.5	34.25	19.0	35.75	19.0										
Lorain N2	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5		
<b>EXTRA STRONG PLAIN ENDS</b>																								
Sparrows Pt. B3	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0										
Youngstown R3	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0										
Fontana K1	16.75		20.75		22.75		23.25		23.75		24.25		24.75											
Pittsburgh J3	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75		
Alton, Ill. L1	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0										
Sharon M3	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0										
Pittsburgh N1	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75		
Wheeling W5	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0										
Wheatland W4	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0										
Youngstown Y1	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75		
Indiana Harbor Y1	28.75	14.0	32.75	18.0	34.75	21.5	35.25	20.5	35.75	21.5	36.25	22.0	36.75	21.0										
Lorain N2	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75		

Galvanized discounts based on zinc, at 11¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: 1/2 in., 3/4 in., and 1 in., 1 pt.; 1 1/4 in., 1 1/2 in., 2 in., 3/4 pt.; 2 1/2 in., 3 in., 1/2 pt. Calculate discounts on even cents per lb of zinc i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only butt weld and seamless, 2 1/4 pts. higher discount. Plain ends, butt weld and seamless, 3 in. and under, 4 1/2 pts. higher discount. 1 Butt weld jobbers' discount, 5 pts. East St. Louis zinc price now 10.0¢.

# Steel Prices

(Effective Nov. 17, 1953)

## CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa., L4	32.7	
Washington, Pa., J2		
Claymont, Del. C9		
New Castle, Ind. J2		32.50
Nickel-carbon		
10 pct. Coatesville, Pa. L4	37.5	
Inconel-carbon		
10 pct. Coatesville, Pa. L4	46.10	
Monel-carbon		
10 pct. Coatesville, Pa. L4	38.90	
Aluminized steel sheets, hot dip, Butler, Pa., A7		

\* Includes annealing and pickling, sandblasting.

## ELECTRICAL SHEETS

22 Ga. H-R cut length	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
F.o.b. Mill Cents Per Lb.							
Beech Bottom W5	8.35	9.60	10.40	10.95	11.50	12.20	
Brackenridge A3	8.35	9.60	10.40	10.95	11.50	12.20	
Granite City G2	8.55	9.80					
Ind. Harbor I3	7.85	8.35	9.60	10.40			
Mansfield E2	7.85	8.35	9.60	10.40			
Newport, Ky. N3	7.85	8.35	9.60	10.40	10.95		
Niles, O. N3	7.85	8.35					
Vandergrift U1	7.85	8.35	9.60	10.40	10.95	11.50	12.20
Warren, O. R3	7.85	8.35	9.60	10.40	10.95	11.50	12.20
Zanesville A7	7.85	8.35	9.60	10.40	10.95	11.50	12.20

## TOOL STEEL

F.o.b. Mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	\$1.66
18	4	1	—	5	2.34
18	4	1	—	—	1.82
1.5	4	1.5	8	—	.895
6	4	2	8	—	1.065
High-carbon chromium					.70
Oil hardened manganese					.39
Special carbon					.355
Extra carbon					.30
Regular carbon					.25

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

## CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	\$110.30 to \$113.80
6 to 24-in., del'd N. Y.	113.50 to 114.50
6 to 24-in., Birmingham	96.50 to 101.00
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	\$128.00 to \$130.00
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

## WARE-HOUSES

Base price f.o.b., dollars per 100 lb.

HOUSES		Sheets			Strip		Plates	Shapes	Bars		Alloy Bars				
Cities	City Delivery Charge	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed	
Baltimore	\$.20	6.20	7.64	7.78	7.00		6.85	6.98	6.86	8.17					
Birmingham	.15	6.15	7.00	8.00 <sup>4</sup>	6.30		6.35	6.35	6.15	8.75					
Boston	.20	6.89	7.83	9.18	7.13	9.23-9.35 <sup>2</sup>	7.13	7.06	6.87	8.35	12.05		14.50		
Buffalo	.20	6.20	7.15	9.00	6.65		6.65	6.55	6.35	7.70	11.95		14.25		
Chicago	.20	6.35	7.70	9.01	6.79		6.68	6.59							
		6.18	7.12	8.00	6.42		6.33	6.46	6.28	7.30	11.75		14.25		
							6.38								
Cincinnati	.15	6.51	7.19	8.42	6.72		6.75	6.93	6.58	7.66	12.17		14.87		
Cleveland	.20	6.18	7.12	7.90	6.58		6.50	6.79	6.34	7.65	11.89		14.39		
Denver		7.95	8.85	10.47	8.20	9.55	7.95	7.95	8.05	9.05	16.05		15.75		
Detroit	.20	6.35	7.25	8.29	6.30	7.36	7.00	6.93	6.56	7.60	12.27	12.12	14.52	13.44	
		6.45	7.32		7.31	8.35			6.57	7.69				14.62	
Houston	.20	7.15	7.60	9.40	7.45		7.20	7.35	7.45	9.85	12.95				
			7.85												
Kansas City	.20	6.85	7.79	8.67	7.09		7.00	7.13	6.95	8.08	12.42				
							7.05								
Los Angeles	.20	7.25	9.00	9.35	7.55	10.75-11.30	7.20	7.35	7.15	9.10	13.20	13.05	15.75	15.85	
									7.25	9.75			16.05		
Memphis	.10	6.79	7.69		6.90		7.01	7.09	6.88	7.89					
									8.31						
Milwaukee	.20	6.35	7.12	8.00	6.59	8.07	6.50	6.61	6.45	7.57	11.55		15.13		
				8.17	6.60		6.55	6.63							
New Orleans	.15	6.51	7.41	9.32	6.63	10.42	6.73	6.81	6.60	8.42					
								7.45		10.42					
New York	.30	6.78	7.75 <sup>6</sup>	8.42	7.16	9.05	6.99	6.90	7.06	8.43	12.29	12.14	14.54	14.64	
			8.20	9.00 <sup>3</sup>											
Norfolk	.20	6.90			7.20		7.15	7.20	7.20	8.50					
Philadelphia	.25	6.53	7.55	8.65	7.02		6.63	6.67	6.87	8.24	12.04	11.89	14.29	14.39	
Pittsburgh	.20	5.95	6.82	8.30	6.20		6.03	6.07	5.98	7.65		11.45		13.75	
		6.18		8.60	6.55		6.33	6.46	6.28			11.75		14.25	
Portland	.10	8.15	8.70	9.40	7.90		7.55	7.50	7.60	10.05					
		8.95	9.85												
Salt Lake City	.20	9.05	10.80	10.65	9.35	11.25	8.70	8.85	9.10	11.25					
								9.20							
San Francisco	.20	7.35	8.70	9.90	7.60	10.35	7.20	7.25	7.15	9.75	13.20	12.80	15.50	15.55	
				10.15					9.85			13.05	16.05	16.05	
Seattle	.20	8.15	9.50	9.80	8.00		7.60	7.50	7.60	10.65		13.40		16.00	
St. Louis	.20	6.48	7.42	8.30	6.72	8.47	6.73	6.86	6.58	7.50	12.20	12.05	12.20	14.55	
								7.70							
St. Paul	.15	6.84	7.78	8.66	7.08		6.99	7.12	6.94	8.06		12.42			

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.  
Exceptions: (1) 500 to 1499 lb. (2) 20,000 lb or over. (3) 450 to 1499 lb. (4) 500 to 9999 lb. (5) 1000 lb or over. (6) 400 to 1499 lb.

## MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9 1/2" x 12 1/2" ga.	1/2" Fence Posts	Single Loop Bale Ties	Twisted Barbed Wire	Galv. Barbed Wire	Merch. Wire Ann'd	Merch. Wire* Galv.
	Col	Col	Col	Col	Col	Col	Col	Col
Alabama City R3	131	140		149	153	6.675	7.075	
Aliquippa, Pa. J3	131	143			150	6.675	7.20	
Atlanta A8	134	146		152	159	6.925	7.475	
Bartonville K2	131	143			156			
Buffalo W6								
Chicago, Ill. N4	131	143		149	156	6.675	7.225	
Cleveland A6	137							
Crawfordsville M4	133	145		151	153	6.775	7.325	
Dunora, Pa. A5	131	140		149	153	6.675	7.075	
Fairfield, Ala. T2	131	140		149	153	6.675	7.075	
Houston D4	139	148			153	6.675	7.075	
Joliet, Ill. A5	131	140		149	153	6.675	7.075	
Kokomo, Ind. C9	133	142		151	155	6.775	7.175	
Los Angeles B2								
Kansas City S2	143	155		161	168	7.275	7.825	
Minneapolis C6	136			145	154	6.925	7.325	
Monessen P6	131	145			157	6.675	7.225	
Moline, Ill. R3								
Pittsburg, Cal. C7	150	163		173	173	7.625	8.025	
Portsmouth P7	132							
Rankin, Pa. A5	131	140			153	6.675	7.075	
So. Chicago R3	131	140		149	153	6.675	7.075	
S. San Fran. C6								
Sparrows Pt. B3	133			151	158	6.775	7.325	
Struthers, O. Y1								
Worcester A5	137							
Williamsport, Pa. S10	133			158				

Cut Nails, carloads, base \$8.00 per keg (less 20¢ to jobbers), at Conshohocken, Pa. (A7).  
\* Alabama City and So. Chicago don't include zinc extra. Galvanized products computed with zinc at 11.0¢ per lb.

## C-R SPRING STEEL

		CARBON CONTENT				
Cents Per Lb. F.o.b. Mill		0.26	0.41	0.61	0.81	1.06
		0.40	0.60	0.80	1.05	1.35
Bridgeport, Conn. S7*	5.75	7.65	8.60	10.55	12.85	
Carnegie, Pa. S9		7.65	8.60	10.55	12.85	
Cleveland A5	5.45	7.65	8.60	10.55	12.85	
Detroit D2	5.70	7.85	8.80			
Harrison, N. J. C11			8.90	10.85	13.15	
New Castle, Pa. B4	5.80	8.00	8.60			
New Haven, Conn. D1	6.70	7.95	8.55	10.50		
Riverdale, Ill. A1	5.70	7.80	8.75	10.70	13.00	
Sharon, Pa. S1	5.45	7.65	8.60	10.55	12.85	
Trenton R4		7.95	8.55	10.50	12.80	
Wallingford, Conn. W1	6.20	7.95	8.90	10.85	13.15	
Weirton, W. Va. W3	5.80	8.00	8.60	10.55	12.85	
Worcester, Mass. A5	5.75	7.95	8.90	10.85	13.15	
Youngstown C5		8.00	8.60	10.55	12.85	

\* Sold on Pittsburgh base.

## BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft.	Size		Seamless		Elec. Weld	
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
F.o.b. Mill						
Babcock & Wilcox	2	13	30.08	36.28	26.51	31.98
	2 1/2	12	40.51	48.86	35.70	43.07
	3	12	45.92	55.39		49.73
	3 1/2	11	53.60	64.65	48.13	58.06
	4	10	65.91	79.50	63.92	77.10
National Tube	2	13		32.98	24.88	
	2 1/2	12	36.82	44.41	33.50	
	3	12	42.52	51.28	38.69	
	3 1/2	11	49.63	59.87	45.16	
	4	10	65.91	79.50	59.97	
Pittsburgh Steel	2	13	27.34	32.98		
	2 1/2	12	36.82	44.41		
	3	12	42.52	51.28		
	3 1/2	11	49.63	59.87		
	4	10	65.91	79.50		

## Miscellaneous Prices

(Effective Nov. 17, 1953)

### RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rail	Light Rail	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer U1	4.325	5.20	5.275				
Chicago R3				7.05			
Cleveland R3							
Ensley T2	4.325	5.20					
Fairfield T2		5.20				5.125	
Gary U1	4.325	5.20				5.125	
Ind. Harbor I3	4.325	5.275	7.05			5.125	
Johnstown B3		5.20					
Joliet U1		5.20	5.275				
Kansas City S2				7.30			11.00
Lackawanna B3	4.325	5.20	5.275			5.125	
Lebanon B3				7.05	10.50		11.00
Minnequa C6	4.325	5.70		7.05	11.55		10.35
Pittsburgh O1					10.50		11.00
Pittsburgh P5					10.50		11.00
Pittsburgh J3				7.05			
Pittg. Cal. C7						5.275	
Seattle B2				7.55		5.275	11.50
Steeltown B3	4.325		5.275			5.125	
Struthers Y1						5.275	
Torrance C7						5.275	
Youngstown R3				7.05			

### LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of season.

	Gross Ton
Openhearth lump	\$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	

Prices based on upper Lake rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

### COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	\$14.25 to \$14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$16.50 to \$17.00
Foundry, oven coke	
Buffalo, del'd	\$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.95
Swedeland, Pa., f.o.b.	23.85
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.86
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, del'd	33.31
Lone Star, Tex., f.o.b.	18.50

### ELECTRODES

Cents per lb, f.o.b. plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
GRAPHITE		
24	84	20.50
20	72	20.00
12, 14, 18	72	20.50
7 to 10	60	21.00
6	60	23.25
4	40	26.00
3	40	27.25
2 1/2	30	28.00
2	24	43.50
CARBON		
10	100, 110	8.95
15	110	8.95
20	110	8.95
24	72 to 84	9.10
20	90	8.95
17	72	9.10
14	72	9.50
10, 12	60	10.30
8	60	10.55

### BOLTS, NUTS, RIVETS, SCREWS

#### Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

#### Nuts, Hot Pressed, Cold Punched—Sq.

	Pct Off List	Less Keg	K.	Less Keg	K.
	Reg.			Hvy.	
1/2 in. & smaller	+2	15		+2	18
9/16 in. & 5/8 in.	+7	11		+32*	+10*
3/4 in. to 1 1/2 in.					
inclusive	+8	10		+27**	+6**
1 1/2 in. & larger	+9	9		+27	+6
* 9/16 to 3/4 in.					
** 3/4 to 1 1/2 in.					

#### Nuts, Hot Pressed—Hexagon

1/2 in. & smaller	11	26	8	23
9/16 in. & 5/8 in.	2	18	+20	net
3/4 in. to 1 1/2 in.				
inclusive	+6	12	+25	+4
1 1/2 in. & larger	+8	10	+25	+4

#### Nuts, Cold Punched—Hexagon

1/2 in. & smaller	11	26	8	23
9/16 in. & 5/8 in.	9	24	+2	15
3/4 in. to 1 1/2 in.				
inclusive	+1	16	+9	9
1 1/2 in. & larger	+16	3	+20	net

#### Nuts, Semi-Finished—Hexagon

1/2 in. & smaller	23	36	14	28
9/16 in. & 5/8 in.	18	32	4	20
3/4 in. to 1 1/2 in.				
inclusive	8	23	+8	10
1 1/2 in. & larger	+14	5	+20	net
Light				
7/16 in. & smaller		33	43	
1/2 in. thru 3/4 in.		26	37	
3/4 in. to 1 1/2 in.				
inclusive	18	30		

#### Stove Bolts

	Pct Off List
Packaged, steel, plain finished 4 1/2—10	
Packaged, plain finish	25 1/2—10
Bulk, plain finish**	59*

\*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

\*\*Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

#### Rivets

	Base per 100 lb
1/2 in. & larger	\$3.90
7/16 in. and smaller	30

#### Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, 1/4 in. thru 3/4 in. x 6 in. SAE 1020, bright	40
3/4 in. thru 1 in. up to & including 6 in.	26
1/4 in. thru 3/4 in. x 6 in. & shorter	
high C double heat treat	43
3/4 in. thru 1 in. up to & including 6 in.	33
Milled studs	17
Flat head cap screws, listed sizes	12
Fillister head cap, listed sizes	7
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	37

#### Machine and Carriage Bolts

	Pot Off List	
	Less	C.
	Case	
1/2 in. & smaller x 6 in. & shorter	4	20
9/16 in. & 5/8 in. x 6 in. & shorter	5	21
3/4 in. & larger x 6 in. & shorter	3	19
All diam. longer than 6 in.	+4	13
Lag, all diam. x 6 in. & shorter	12	27
Lag, all diam. longer than 6 in.	8	23
Plow bolts	30	

### REFRACTORIES

#### Fire Clay Brick

Carloads, per 1000  
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00) \$109.00  
No. 1 Ohio 102.00  
Sec. quality, Pa., Md., Ky., Mo. Ill. 102.00  
No. 2 Ohio 93.00  
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50) 16.00

#### Silica Brick

Mt. Union, Pa., Ensley, Ala. \$115.00  
Childs, Hays, Pa. 120.00  
Chicago District 125.00  
Western Utah 131.00  
California 138.00  
Super Duty  
Hays, Pa., Athens, Tex., Windham 132.00  
Curtner, Calif. 150.00  
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 19.00  
Silica cement, net ton, bulk, Hays, Pa. 21.00  
Silica cement, net ton, bulk, Chicago District, Ensley, Ala. 20.00  
Silica cement, net ton, bulk, Utah and Calif. 28.50

#### Chrome Brick

Per net ton  
Standard chemically bonded Balt. \$86.00  
Standard chemically bonded, Curtner, Calif. 96.25  
Burned, Balt. 80.00

#### Magnesite Brick

Standard Baltimore \$109.00  
Chemically bonded, Baltimore 97.50

#### Grain Magnesite

St. %-in. grains  
Domestic, f.o.b. Baltimore in bulk fines removed \$64.40  
Domestic, f.o.b. Chewalah, Wash., in bulk 38.00  
in sacks 43.75

#### Dead Burned Dolomite

Per net ton  
F.o.b., bulk, producing points in:  
Pa., W. Va., Ohio \$14.50  
Midwest 14.60  
Missouri Valley 13.65

### FLUORSPAR

Washed gravel, f.o.b. Rosiclare, Ill. Price, net ton: Effective CaF<sub>2</sub> content  
72 1/2% \$44.00  
70% or more 42.50  
60% or less 38.00

### METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron, c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, del's. in East	12.0¢
Domestic sponge iron, 98+ Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+ Fe	44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+ Fe	60.0¢
Hydrogen reduced iron, minus 300 mesh, 98+ Fe	53.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+ Fe	83.0¢ to 1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb. 95% plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd.	33.50
Lead	21.75¢
Manganese	57.0¢
Molybdenum, 99%	52.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	33.5¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	83.9¢
Stainless steel, 316	31.10
Tin	14.0¢ plus metal value
Tungsten, 99% (65 mesh)	55.35
Zinc, 10 ton lots	23.0¢ to 30.5¢

# Ferroalloy Prices

(Effective Nov. 17, 1953)

## Ferrochrome

Contract prices, cents per lb contained Cr, lump size, bulk, in carloads, delivered. 65-72 Cr, 1% max. Si.

0.025% C	34.50	0.20% C	33.50
0.06% C	34.50	0.60% C	33.25
0.10% C	34.00	1.00% C	33.00
0.15% C	33.75	2.00% C	32.75
65-69% Cr, 4-9% C	34.75		
62-66% Cr, 4-6% C, 6-9% Si	35.60		

## S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered. High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	26.85
Ton lots	28.00
Less ton lots	29.50

## High-Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

## Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	\$1.18
0.50% max. C	1.14
9 to 11% C	1.11

## Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, bulk 2-in. x down, 25.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 35.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

## Calcium-Silicon

Contract price per lb of alloy, lump delivered. 30-33% Cr, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

## Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy lump, delivered. 16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

## SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 13 mesh.

Ton lots	17.80
Less ton lots	19.50

## V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.80
Less ton lots	17.75

## Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

## Ferromanganese

Maximum contract base price, f.o.b., lump size:

Producing Point	Base Mn Content	Cents per lb (Contained Mn)
Marietta, Ashtabula, O.		
Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	76-80%	13.15
		(Per lb of alloy)
Clairton, Pa.	74-76%	10.00
Johnstown, Pa.	74-76%	10.00
Sheridan, Pa.	74-76%	10.00
Add or subtract 0.1¢ for each 1% Mn above or below base content.		
Briquets—delivered, 66 pct Mn.		
Carloads, bulk		12.50
Ton lots, packed		14.05

## Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	Price
16 to 19%	3% max.	\$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

## Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered. 95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.35
Ton lots	38.45

## Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	31.50
Ton lots	33.50
Less ton lots	35.50
Premium for hydrogen-removed metal	1.50

## Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn

	21.35¢
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## Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	30.00	31.85 33.05
0.07% max. C	27.95	29.80 31.00
0.15% max. C	27.45	29.30 30.50
0.30% max. C	26.95	28.80 30.00
0.50% max. C	26.45	28.30 29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30 26.50

## Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.40
Ton lots	13.05
Briquet contract basis carlots, bulk delivered, per lb of briquet	12.65
Ton lots, packed	14.25

## Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$95.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00. Add \$1.00 per ton for each additional 0.50% Si up to and including 17%. Add \$1.45 for each 0.50% Mn over 1%.

## Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	18.00
97% Si, 1% Fe	18.50

## Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

## Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

Si	Price	Si	Price
25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
65% Si	13.60	90.95% Si	17.00

## Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	\$2.05	\$2.95	\$3.75
Less ton lots	2.40	3.30	4.55

## Ferrovandium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	\$3.00-\$3.10
Crucible	3.10-3.20
High speed steel (Primors)	3.20-3.25

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis f.o.b. Suspension Bridge, N. Y.

Carloads	9.90
Ton lots	11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo.

	\$1.15
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Ferrocolumbium, 50-60% 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	\$6.04
Less ton lots	6.45

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30% C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta

	\$4.75
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Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo

	\$1.32
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Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton

	\$90.00
10 tons to less carload	\$110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	\$1.35
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Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	\$1.50
Less ton lots	1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton

	\$177.00
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Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b.

	\$4.45
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Molybdenic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.

	\$1.14
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Molybdenic oxide, bags, f.o.b. Washington, Pa. Langeloth, Pa.

	\$1.12
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Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢

Vanadium Pentoxide, 86-89% V<sub>2</sub>O<sub>5</sub> contract basis, per pound contained V<sub>2</sub>O<sub>5</sub>

	\$1.28
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Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Ton lots	21.00¢
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Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.

Carload, bulk	8.00¢
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## Boron Agents

Borasil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4% Si, 40-45%, per lb contained B

	\$5.25
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Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots, per pound	10.00¢
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Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots

	\$1.20
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F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 10% B	1.20
19% min. B	1.50

Gratnal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.

No. 1	\$1.00
No. 6	68¢
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd

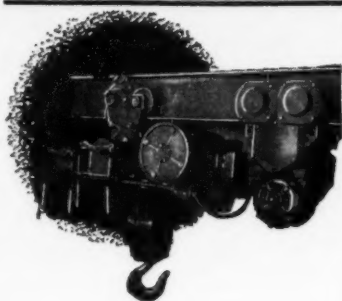
Ton lots	01.46
Less ton lots	1.57

Nickel-Boron, 15-18%, B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered

Less ton lots	\$2.05
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Silicaz, contract basis, delivered. Ton lots

	45.00¢
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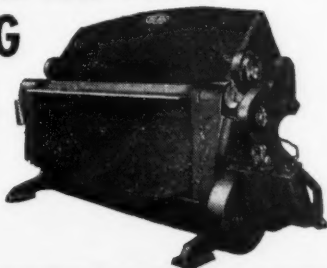
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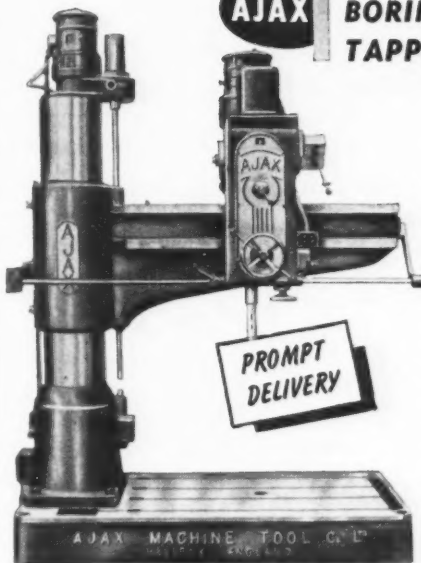
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The Ajax Radial Drill meets all the demands of the best high speed steel and carbide tipped tools. High quality materials and workmanship, together with the utmost ease of handling the centralized controls guarantee a long and trouble-free life.

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### PARTIAL SPECIFICATIONS

Max. radius of spindle from ctr. of col.	5'0"
Saddle traverse along arm	3'2"
Baseplate	4'9"
Length of working surface	3'0"
Width of working surface	9"
Height of working surface	9"
±4 Morse taper	
Spindle speeds (8)	60 to 1114 rpm

*Sales Territories  
Open*

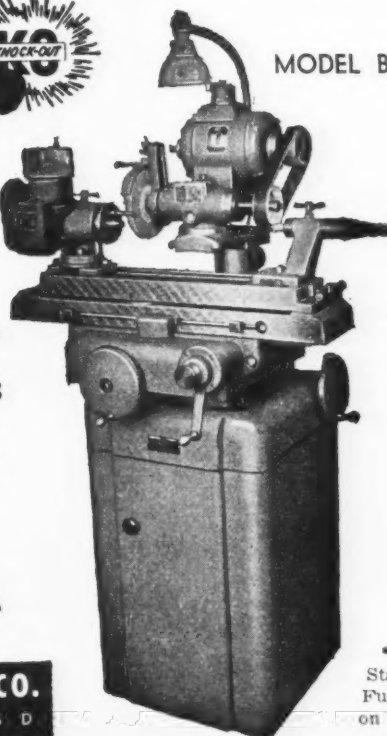
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ABERDEEN, S. D.

\*Sales  
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# RE-NU-BILT GUARANTEED ELECTRIC POWER EQUIPMENT

## D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2300	G.E.	MCF	600	400/500
1	2000	Whse.	Mill	600	230/460
1	940	Whse.	QM	250	140/170
1	900	Whse.		250	450/550
1	835	Whse.		250	85/190
1	800	AL Ch.		250	400/800
1	550	Whse.	CC-314	600	300/900
1	450	Whse.		550	415
1	400	G.E.	MCF	550	300/1050
1	300	Whse.	CB-5094	250	575/1150
1	200/300	G.E.	MPC	230	300/920
1	300	Rel.	1670T	230	720
1	300	Whse.	CB-5118	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	45H	230	1150
1	150	Cr. Wh.	28H-TEFC	230	960
1	150	Whse.	SK-151H	230	900/1800
1	150	Whse.	SK-201	230	380/950
1	50/120	G.E.	MCF	230	250/1000
1	100	Whse.	SK-181	230	450/1000
1	100	G.E.	CDP-115	230	1750

## MILL & CRANE

1	50	G.E.	CO-1810	230	725
1	30	Whse.	K-5	230	975
4	15	Whse.	K-5	230	630
1	10	C.W.	SCM-AH	230	1150
1	10	G.E.	MD-104	230	400/800
1	6.35	Whse.	K-3	230	630
1	8	C.W.	SCM-FF	230	1750
1	8	Whse.	HK-2	230	835

## A.C. MOTORS

### 3 phase—60 cycle

Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT-498	2300	360
1	1500	ABB		2300	720
1	1200	G.E.	MT	2300	275
2	1000	A.C.	Mill	2300	240
1	500	Whse.	CW	550	850
1	500	G.E.	I-M	2300	900
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1218	2300	435
1	350	G.E.	MT-442Y	2300/4000	253
2	300	G.E.	MT-565Y	2300	900
1	250	G.E.	MT-424-Y	4000	257
1	250	G.E.	MT-5598	2300	1800
1	250	AL Ch.		550	600
1	240	Cr. Wh.	26QB	440	595
1	200	G.E.	IM-16	440	600
1	200	G.E.	IM	440	435
1	200	G.E.	MTP	440	1170
1	150 (unused)	Whse.	CW	2300	435
1	150	G.E.	IM-10	440	600
1	125	A.C.		440	865
1	125	AL Ch.		440	720
4	125	G.E.	MT-566Y	440/2200	435
1	100	G.E.	IM	440	600
1	100	A.C.	ANY	440	605
1	100	G.E.	IM-16	2300	435
1	100	Whse.	CW-868A	440	700

## SQUIRREL CAGE

1	850	G.E.	FT-559BY	440	3570
2	450	Whse.	CS-1420	2300/4150	254
1	200	G.E.	IK-17	440	580
1	200	G.E.	KT-557	440	1800
1	150	Whse.	CS-8568	440	880
1	150	Whse.	CS	440	580
1	150/75	G.E.	IK	440 900/450	
2	125	AL Ch.	ARW	2200	1750
1	125	Whse.	MS	440	485

## SYNCHRONOUS

1	8500	G.E.	TH	2300	257
1	2100	G.E.	ATI	2300	360
1	1750	G.E.	ATI	2300	3600
2	2000	Whse.		2300	120
1	735	G.E.	ATI	2300/12000	600
1	450	Whse.		2300	450
1	350	G.E.	TH	2300	150

## M-G Sets—3 Ph. 60 Cy

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
1	3000/3400	G.E.	450	250/300	2300/4600
1	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	500 25c	600	11000
2	2000	G.E.	514	600	6600/13200
1	1500	G.E.	514	250	6600/13200
1	1500	G.E.	514	600	6600/13200
1	1500	G.E.	600	600	4160
1	1500	C.W.	514	80/115	4000/13000
1	1000	Whse.	900	600	4160
1	1000	G.E.	900	260	6600
1	1000 (SU)	G.E.	900	250	2300
1	750	Whse.	900	275	4160
1	750	C.W.	514	20/115	2300
1	600	G.E.	720	250	440/2300
1	500	G.E.	720	135	2300
1	500	Whse.	900	125/250	440
1	500	Whse.	1200	125/250	2300
1	400 (SU)	Cr. Wh.	1200	125/250	2300
1	150	Whse.	1200	275	2300
1	140 (SU)	Cr. Wh.	600	125/250	440/2300
1	100	G.E.	1200	250	2300/4000
1	100	G.E.	1170	125	220/440

## FREQUENCY CHANGER SETS

Qu.	KW	Make	Freq.	Voltages
1	12500	Whse.	25/60	13200/13200
1	8000	G.E.	25/60	3300/2300/4000
1	2500	G.E.	25/62.5	2300/2500
1	1000	G.E.	25/58.3	4400/2800
1	500	AL Ch.	25/60	11000/2300

**BELYEA COMPANY, INC.**  
47 Howell Street, Jersey City 6, N. J.

# The Clearing House

## NEWS OF USED AND REBUILT MACHINERY

Some Will Fold . . . Used machinery dealers in the Northwest feel somewhat like the student going to a final exam who hears his professor say, "Look at the two men next to you. One of the three of you won't be here next term."

With business slipping considerably in recent months, some dealers don't even want to look too closely in the mirror, fearing that they may spot the man who won't be around next quarter. One of the largest dealers in the area openly states he is certain a few dealers will be forced out of business by spring.

What Caused Drop . . . Slumps in two of the Northwest's most important industries are the main reasons behind the decline of the used machinery market. The lumber industry has been hard hit by order cancellations since the end of the Korean war and also by a softening of civilian demand.

Coupled with this is the fact that the fishing industry has just gone through one of its most disastrous years. Canneries have taken heavy losses.

Result of setbacks for both these industries is a slump in machine shops and foundries supplying equipment for the lumber mills and canneries. Because of this, few machine shops or foundries are interested in investing in machine tools or other capital goods.

Machinery Eases . . . There is, however, one bright spot in the otherwise murky Northwest used machinery market: dealers report late model equipment is beginning to make an appearance. For a long time, dealers in the Pacific Northwest have been even more hard-pressed than used machinery firms in other areas in trying to locate late model machinery.

Now that they have access to better merchandise, dealers hope there will be an improvement in their sales reports. Acquiring up-

to-date equipment is still no easy matter, however, since much of it has to be shipped in from Chicago, Cleveland and Detroit.

One of the most unusual transactions put through in recent months in the area was one dealer's shipment of a 45-ton straightening roll to Italy. The mill was a 10-ft, three-quarter-ton capacity unit which was shipped by steamer from Seattle.

ODM Investigates . . . At the last meeting of the Detroit Chapter of the Machinery Dealers' National Assn. it was reported that Office of Defense Mobilization has been making spot checks on installations of government-owned machine tools. ODM is interested in making sure the tools are being stored and maintained properly and is using committees of two dealers and one user to make the checks.

Recently one of these dealer-user committees spent 2 days inspecting the Park Ridge installation. Some valuable suggestions on better storage and maintenance resulted.

Attitude Changed . . . As is pointed up in the report on the Detroit meeting this is a drastic change from the days when the government went ahead on its own and then advised MDNA of what had been done.

The fact that MDNA is now consulted in advance and called upon to help out on many programs is a reflection of a change in the government viewpoint and also of the increasing recognition being given MDNA.

It is also reported that MDNA is investigating the possibility of being represented at various industry association shows. MDNA's Public Relations Committee, headed by Frank Laurens, Laurens Bros., Inc., Cincinnati, has been instructed to study the possibility of MDNA participation at such meetings.